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The Chemical Age

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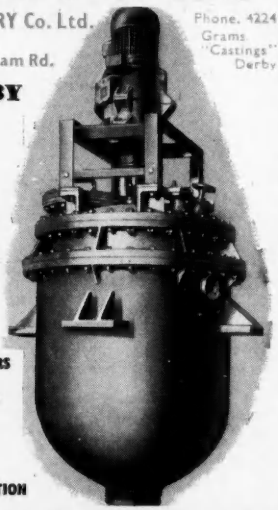

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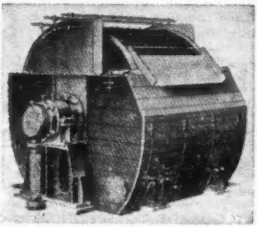

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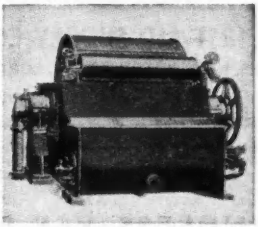

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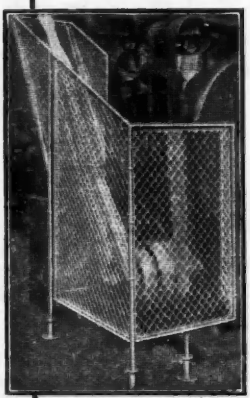

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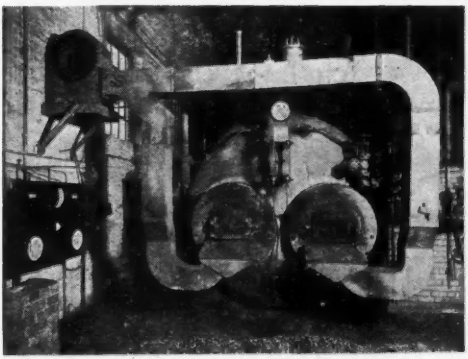

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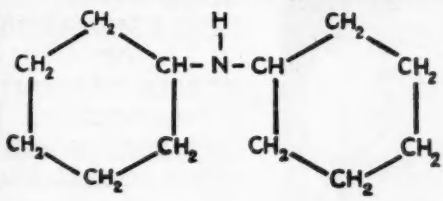

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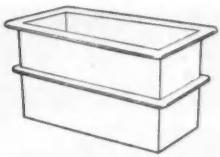

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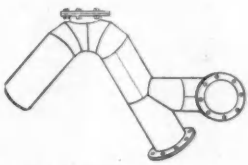

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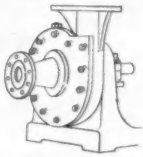

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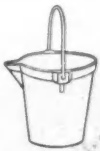

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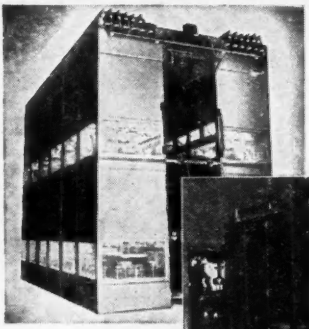

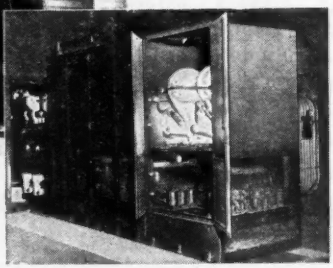

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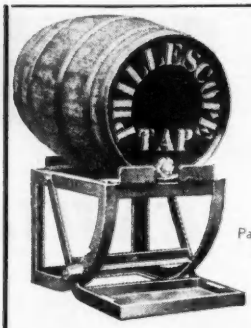

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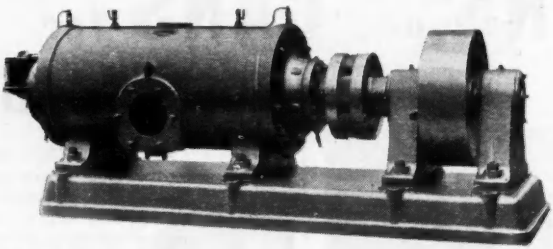

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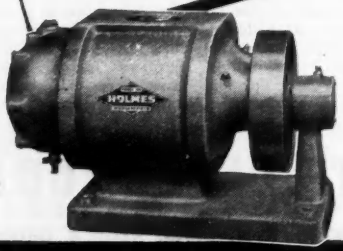

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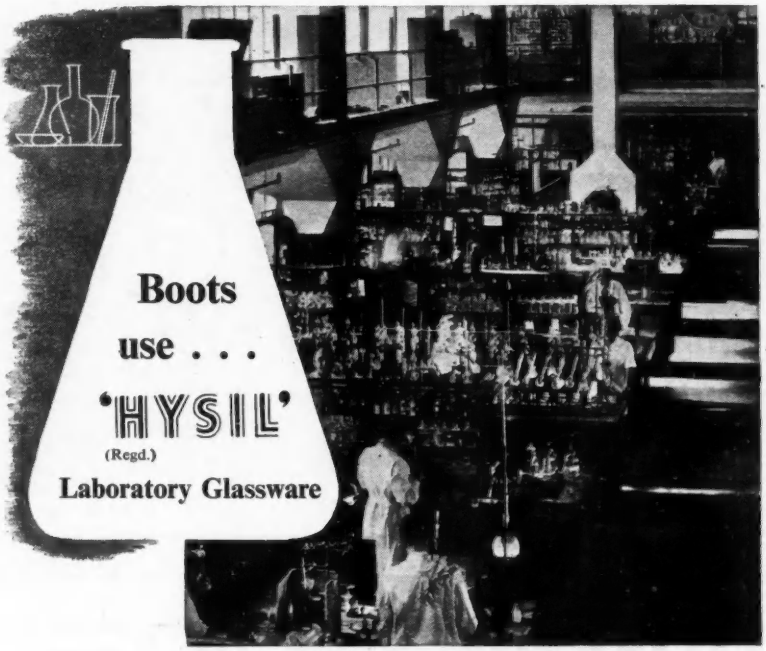

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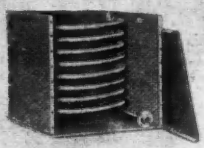

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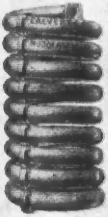

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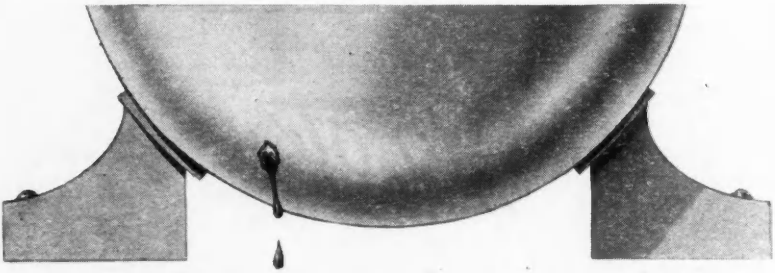

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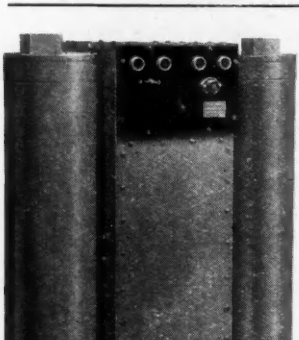

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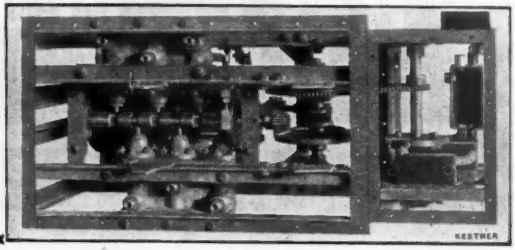

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Petroleum Planning

WHETHER petroleum industry in Great Britain is in its infancy or its adolescence has never been satisfactorily established. Any estimation of the kind depends upon varying conceptions of the growth yet required to bring it to maturity. Perhaps the only common ground is that petroleum industry—refining, chemical derivatives and the plant required for all these things and the winning of the oil itself—is a lusty young thing with great expectations. How highly its potentialities are rated by Americans deeply experienced in oil economy is attested by the uneasiness recently revealed about the current British policy to make fuller use of our own Mediterranean and Middle Eastern oil resources and the curtailment of the liberal Marshall Aid for constructing British refineries at home and abroad. Yet, before very long, the U.K. refinery capacity will be five times greater than it was before the war, there will be three petroleum-based chemical plants and two others to make special materials from oil, notably for the plastics industry.

All these portents emphasise how essential it is that there should be the maximum development in the shortest time of the home production of petroleum equipment—of all kinds. The extent to which this has already been secured may be roughly gauged by reference to the exports of such plant: in 1939 it was valued at £11 million; in 1949 at £63 million. That evidence alone does not automatically dispose of the criticism voiced not long ago by representatives of some of the great oil refining companies: that British plant was unnecessarily costly, sometimes not well adapted to current requirements and often slow to arrive where it is wanted. It would be surprising if some of these charges were not justified, when it is borne in mind how young is this branch of chemical engineering, largely neglected for six years in favour of more immediate wartime needs and since then denied the support of a large-scale petroleum industry and its associated technology.

Those deficiencies are now in process of being made good and there are reasons to expect an increasingly integrated policy by U.K. makers of petroleum plant, to secure the valuable rewards awaiting here and overseas, in the very active existence of regulating and advisory bodies such as the Council of British Manufacturers of Petroleum Equipment. That council, founded in 1943, has brought together representatives of almost every interest serving

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the petroleum industry in all its fields, not excluding prospecting and drilling. It aims to serve the interests of 360 members (there were 15 in 1943) and of petroleum industry by directing attention to equipment technology, to the materials and services being sought, and by an elaborate liaison system to make known technical and statistical information and all the type of world news which can help to shape plant makers' policy. Petroleum industry itself may benefit almost as much by the information on availability of equipment and services, on which the council can speak with authority.

Another promising development with similar aims was represented by the creation, at the request of the council in 1945, of the Petroleum Equipment Industry Standards Committee, a protegeé of the British Standards Institution, combining the interests of makers and users. Sub-committees of this group have in hand one of the most urgent problems of the moment, that of bringing British material into line, dimensionally, physically and chemically, with similar American material in common use.

Minor differences between British petroleum appliances and the American equivalents, upon which most users formerly depended, is likely to have been the cause of most complaints in the past. Some degree of leadership evidently belongs to the much more mature and privileged American industry, but there are inevitable difficulties involved in such " remote control," which the British groups are designed to minimise. Rapid deliveries cannot be secured when, as in one actual example, a British manufacturer is asked to quote for a piece of equipment designated " as illustrated in Fig. 106 in . . . " an American brochure.

In view of the importance of petroleum equipment as a means both of saving and earning dollars, every effort is being made to take full advantage of the very favourable markets which exist. The country which has led the world in radar and jet-propelled aircraft will not be expected to lag behind in the production of oil equipment, least of all after experiencing the degree of success which has already been achieved in building up the new industry during a period of exceptional difficulties.

Notes and Comments

Selling to America

IT is becoming very apparent that there is room in the U.S.A. and Canada for British goods, provided they are selectively marketed and presented in a way acceptable on the other side of the Atlantic. The congress held in London this week, organised by the Incorporated Sales Managers' Association and the (U.S.) National Sales Executives, emphasised the truth of this. The diffidence that is sometimes felt here about the ethics and prospects of an attack on the traditional American home markets finds no encouragement at all in the advice given this week by the team of American sales managers discussing "Sales Planning for Dollar Markets." Mr. G. J. Ticoulat, who manages the sales of the Crown-Zellerbach Corporation, San Francisco, gives the assurance that America wants competition and welcomes any stimulus to trade—even a foreign one. One of the lessons which this congress has made very clear is that the only entirely satisfactory way of learning the peculiar and often exacting requirements of a product in the U.S. markets is to go there yourself, study contemporary products and production methods there and decide how a British manufacturer could improve on them. The last is certainly not impossible if full advantage is taken of the cheap sterling factor.

Chemical Markets in India

THE reluctance to talk about their affairs, in which some chemical industries rival the "Silent Service," cannot entirely disguise the remarkable character of overseas chemical trading performance. The commentary which comes from time to time from outside sources is helping to set in perspective the magnitude of last year's achievement in selling to overseas users over £86 million worth of chemicals, £2.5 million more than in 1948. That the receptive markets which existed immediately after the war are no longer the common phenomenon is shown by the significant evidence about Indian sales, which the U.K. Senior Commissioner in India has provided. This reflects, among other things, the effects of the continued campaign in India to restrict or exclude foreign chemicals whenever there are possibilities that home industries could supply the needs. The success of the "import resistance movement" in India—although it was, of course, not the only factor—may be seen in the fact that chemicals and preparations and dyes and colours were the only groups among India's staple imports which suffered reductions in 1949. The value of the first fell from approximately £9.3 million (in 1948) to £7.8 million, and dyes and dyestuffs also were cut by about £2 million, to £4.8 million. There is, fortunately, no element of discrimination against this country in these results. In one six-month period (to September 30, 1949) the United Kingdom raised its sales of all kinds to India to £70 million, compared with £47.3 million in the same half of 1948), while the U.S.A., before devaluation and in spite of its growing participation in Indian economic affairs, had to forgo trade worth £2.4. Its total for the six months was only £73.7 million.

The New Carbon

THE likelihood that any given chemical engineering project may take a new and possibly simplified appearance because of the development of a new constructional material is an incalculable factor which no chemical engineer can afford to overlook. The probability is continually increased by the ability of present-day technology to offer "rare" metals in comparative abundance. The most significant new advance in this direction departs from the conventional in that it is not a metal and utilises a raw material which even today is a

cheap and abundant starting material—coking coal. Added now to the vast field of usefulness of coal is a technique for converting the mined product itself, not one of its innumerable progeny and colaterals, into a form of carbon which has, in addition to the characteristic chemical inertness and resistance to high temperatures, a good strength: weight ratio, imperviousness to liquids and gases and some other properties which few metals or ceramics combine so well. Basically, the source of the important new properties and adaptability of Delanium—the name coined by the Powell Duffryn group, which originated it—is the observation that coking coal, like some other carbonaceous materials, can be induced to harden and contract (up to 45 per cent by volume) in the plastic stage of its thermal composition to produce a graphitic carbon of extreme density, bonded by intimate carbon-carbon linkages. That is necessarily an over-simplification of a considerable physico-chemical achievement. Its likely results in the form of improved efficiency, durability and space saving in the construction of heat exchangers, tower packings and vessels for chemicals and gases will be looked for with interest.

Study of Dermatitis

A BOGEY of medical research—industrial dermatitis—which has defied so long the provision of generally effective cures, was conjured up last week in some of its more aggressive moods. The occasion was the first showing in London of the film "Industrial Dermatitis" by I.C.I., Ltd., at the British Council Film Theatre. The main intention of the film seems to be to show British industries, particularly the manual worker, the hazards which dermatologists consider the worst. The classes of industrial workers liable to attack by one or other form of dermatitis would appear to be almost unlimited. The coal and coal tar using industries are extremely vulnerable; dust and oils, particularly coal dust and cracking oils, are shown in the film to be among the worst irritants causing skin disorders. But even agricultural workers, who might excusably think theirs a sheltered occupation in this regard, can frequently be affected by such apparently innocent substances as the juice of vegetables, fruits and woods; celery dermatitis is a highly unpleasant form of the disease. I.C.I. took the wise course of mentioning none of their proprietary protective products, and the undoubted value of the film was enhanced by its disinterested approach. The value of that service to industry at large was acknowledged by the Minister of Labour (Mr. George Isaacs) who was one of the audience at this film show.

Science Books

FOR the achievement of having made available to any reader possessed of moderate intelligence and perseverance simplified accounts of scientific events which would have amazed great scientists a century ago, a good deal of the credit must go to the free public libraries. The century which has produced such fundamental changes in scientific horizons and in the means of interpreting them has been the growing period of the free reading principle. Just 100 years ago this year the Public Libraries Act, enabling borough councils to spend the equivalent of a rate of ½d. in the £ on library service, was given rather grudging sanction. Library records since that time have reflected the widest fluctuations in public taste with, in recent years, a steadily increasing readiness to accept popular, and even comparatively advanced accounts of scientific matters. This "unnatural" taste is far from being a passing phase and its growth is giving almost as much satisfaction to some farsighted members of the scientific fraternity as to the publishers. The standpoint of the former was recently epitomised by the secretary of the Department of Scientific and Industrial Research. "An informed democracy is a safe one," said Sir Ben Lockspeiser, "and the more people understand, the greater the likelihood of our science being used to the best advantage.

BAUXITE DEVELOPMENT

ECA Aid for Jamaican Projects

AN ambitious scheme to promote the development of bauxite mining in Jamaica was recently announced by the ECA mission to the United Kingdom. It is intended to provide a new source of dollar earnings for the sterling area and to help conserve the supply of bauxite in the U.S.A.

Under the terms of a contract signed between ECA and the Reynolds Metal Company of Richmond, Virginia, and its subsidiaries, Reynolds Jamaica Mines, Ltd., and Reynolds Mining Corporation, ECA has agreed to advance up to $5,963,000 from its funds and £1.8 million from ECA counterpart funds in Britain.

The funds advanced to the Reynolds Metal Company and its subsidiaries will be used to purchase and install mining, milling and transport equipment. Repayment in the form of finished aluminium will be made to the U.S.A. over a period of 20 years.

The Reynolds Metal Company has already spent some $1 million on exploration and may spend a further similar sum.

Dutch Chemical Expansion

THE Allied reparations authorities have decided that part of the alkali electrolysis plant of Ludwigshafen shall be allocated to a soda plant in Holland which was dismantled and transferred to Germany during the war.

A plant for manufacturing synthetic detergent of the Teepol type has been set up at Pernis, near Rotterdam, by the Bataafsche Petroleum Mij, a subsidiary of Royal Dutch Shell.

A new company, Titaan, N.V., has been founded at Rotterdam, to produce dyes and other chemical and metallurgical products.

DOLLAR AID FOR CARBON BLACK

The ECA has proferred further support to the Godfrey L. Cabot enterprise shortly to produce carbon black in the U.K. using advanced American methods. It takes the form of an increase of the industrial guarantee of convertibility of sterling to the equivalent of $2,025,000 extended to the parent organisation, Godfrey L. Cabot, Inc., Boston, Massachusetts.

ARTIFICIAL FILAMENTS

Six Per Cent More Rayon

THE continued rapid growth of artificial fibre production and recognition that one of the new filaments, nylon, is not yet perfectly adapted to some textile uses have been given prominence this week.

The production of rayon in January totalled 29.5 million lb. This, states the *Board of Trade Journal*, surpassed by 6 per cent the previous peak figure of November, 1949.

Output of continuous filament yarn was 16.0 million lb. and exceeded the November figure by 2½ per cent, while production of staple fibre, at 13.5 million lb., was almost one-tenth higher than the previous best in September last.

Comparison with January 1949 shows total output nearly two-fifths higher, continuous filament yarn rising by one-sixth and staple fibre by four-fifths.

Defects of Nylon

Three disadvantages of nylon, one of the foremost of the synthetic fibres, were pointed out by Mr. B. Sutcliffe, of Courtaulds, Ltd., in a talk on "Man-Made Fibres." He observed that it was difficult to dye, it deteriorated on exposure to light, and was easily stretched with a light load, giving fabric distortion.

Mr. Sutcliffe, who was addressing a joint meeting of the Keighley Textile Society and the Yorkshire section of the Textile Institute, also referred to orlon, a fibre practically complementary to nylon, and described the increasing applications of protein fibres.

END OF MOLASSES CONTROL

Control of distribution of molasses will end on April 1, after which there will be reversion to private trade in all grades. Molasses came under Government control in September, 1939, and since the beginning of 1940 all supplies in this country have been Government-owned.

ECA Supports Oil Purchases

Approval has been given by ECA for purchase by Britain of $13 million worth of crude oil and petroleum products, of which $2 million is to be spent in U.S. possessions, $7.5 million in Latin America, the Dutch West Indies and Trinidad, and $3.5 million in the Middle East.

Basic Chemicals in December

Improvement in Stock Position

THE general level of stocks of basic chemicals and non-ferrous metals in December last showed an improvement over the same month of 1948, except in respect of molasses and industrial alcohol, which were considerably reduced.

Production remained fairly steady and there were increases in the consumption of sulphur, ammonia, and liming materials.

Estimated numbers employed in the chemical and allied trades in December (in thousands) totalled 444.4, which was only slightly lower than the previous month, but showed an increase of 16.1 over December 1948. Distribution of workers was as follows: coke ovens, chemicals and dyes, explosives, etc., 255.8 (187.3 men, 68.5 women); paints and varnishes 38.2 (27.0 men, 11.2 women); oils, greases, glue, etc., 67.4 (53.7 men, 13.7 women); pharmaceutical, toilet preparations, etc., 83.0 (42.3 men, 40.7 women).

These figures and the table given below are abstracted from the *Monthly Digest of Statistics*, No. 50.

	December, 1949 Thousand Tons			December, 1948 Thousand Tons		
	Production	Consumption	Stocks	Production	Consumption	Stocks
Sulphuric acid	151.2	—	—	138.4	136.0	—
Sulphur	—	27.9	87.1	—	24.4	66.1
Pyrites	—	20.4	84.0	—	20.6	68.0
Spent oxide	—	17.0	179.3	—	17.2	169.2
Molasses (cane and beet)	57.7	24.2†	260.6	59.2	25.5†	278.0
Industrial alcohol (mil. bulk gal.)	1.78	2.35	1.83	1.83	2.39	7.89
Ammonia	—	7.01*	5.57*	—	6.61*	5.95*
Superphosphate	18.5	16.3	—	18.1	15.9	—
Compound fertiliser	142.1	105.8	—	141.3	111.9	—
Liming materials	—	524.6	—	—	453.1	—
Nitrogen content of nitrogenous fertilisers	22.76	20.6	—	20.80	20.48	—
Phosphate rock	—	82.0	198.5	—	94.3	161.2
Virgin aluminium	2.56	14.1	—	2.68	16.3	—
Virgin copper	—	25.6	129.7	—	29.5	120.7
Virgin zinc	—	19.0	61.6	—	18.0	46.7
Refined lead	2.19	14.0	51.4	3.46	15.7	20.0
Tin	—	2.19	—	—	2.25	19.2
Zinc concentrates	—	—	73.0	—	12.7	30.3
Magnesium	0.43	0.41	—	0.59	0.44	—
Pig iron	187.0*	135.0	526.0	178.0*	133.0	279.0
Steel ingots and castings (including alloys)	305.0*	—	1,275.0	289.0*	—	1,029.0
Rubber: Reclaimed	0.43‡	0.44‡	2.27	0.46	0.44	4.25
Natural (including latex)	—	4.39	39.2	—	7.06	50.5
Synthetic	—	0.04‡	1.19‡	—	0.05	2.06

* January. † Distilling only. ‡ Average of five weeks.

U.K. Lead Price Reduced

THE reduction in price of U.K. lead by £9 a ton to £88, announced last week, brought the domestic cost of the metal down to its pre-devaluation level.

When sterling was devalued last September the price was advanced to £122, then reduced by stages to £97, at which price it had remained since the last week in November.

The Ministry of Supply has recently had little or no occasion to buy dollar lead, as marginal needs have been met by supplies from Germany and France.

It is felt in many quarters that the time has now come when a London market in lead could be started without loss of hard currency to this country and might well help to establish genuine international values. (*New lead chemical prices : page* 417)

Italian and Spanish Mercury

NEGOTIATIONS for a new mercury marketing agreement between Italy and Spain are now proceeding. A previous agreement assigns 55 per cent to Italy and 45 per cent to Spain, but a larger share is now claimed by Spain on the plea that it is the largest potential producer of mercury in the world. The cinnabar beds at Almaden alone are stated to be good for over 5 million tons of ore, thus placing Spain in a position to supply the needs of the whole world in mercury for the next 50 years.

In 1938 the output at Almaden reached 150,000 bottles of mercury. The Italian mines in Tuscany could provide 50,000 tons of mercury yearly, but they are not fully exploited. Other producers of importance are the U.S.A., Russia and Mexico.

U.S. ALKALI PROCESSES

New Treatments of Chlorine, Caustic Soda and Lye

A NUMBER of newly developed processes for the production and refining of alkalis were described and discussed at a recent Houston (Texas) regional meeting of the American Institute of Chemical Engineers.

The development work to increase the efficiency of electrolytic cells for the manufacture of chlorine and caustic soda was discussed by Deane O. Hubbard, project engineer of Hooker Electrochemical Co., Niagara Falls, N.Y. The trend in the design of cells has been in the direction of larger units, he said. While the early cells were designed for 1000 to 1500 ampères, one French company is now starting a plant with 50,000 ampère mercury cells, believed to be twice the size of the largest cells in operation in the U.S.A.

Mr. Hubbard and his associates have evaluated the Hooker Type S cell in comparison with both smaller and larger cells. It was found to be more economical to use the Type S cells, at 8000 to 10,000 ampères, in plants as small as 5 tons capacity per day than to use smaller cells. Their results also indicated that in plants of 50 tons per day and larger a 20,000 ampère cell could be more economical than a 10,000 ampère cell.

Using Waste Gas

A newly developed process which produces chlorine without caustic soda was described by Mr. Charles P. Roberts, who is connected with the Westvaco Chemical Division of Food Machinery and Chemical Corporation, South Charleston. The new process, he said, would use waste or surplus hydrochloric acid gas as the raw material and would yield a high-purity chlorine gas as the product.

Mr. Roberts described the process as being superior to other currently known methods for recovery of chlorine from hydrochloric acid in several respects, notably those of purity of product and economy of operation. Other methods, however, also are being studied. The process, in its most practical form, he said, consists of the electrolysis of cupric chloride to produce chlorine gas and cuprous chloride. The cuprous chloride thus produced is then oxidised by hydrochloric acid and oxygen to produce more cupric chlorine, which is returned to the electrolysis step.

A recent process for refining caustic soda, or lye, was described by Walter L. Badger. A common method of making solid lye is by drying a 50 per cent solution with the aid of steam heat at moderate temperatures. Badger and his collaborator, David J. Pye, indicated that the new process consists of evaporating the 50 per cent solution to near-dryness at a temperature of about 700°F., using Dowtherm vapour to supply heat.

The principal problems which had to be met, they claimed, were corrosion of equipment and contamination of the lye product. By chemically treating the 50 per cent solution to remove impurities and then evaporating in equipment made of nickel they were able to make a product of high purity without excessive corrosion.

The practical possibilities of the process for large-scale production have been demonstrated in a small plant producing continuously at the rate of 60 tons per day.

Robert M. Crawford, consulting engineer, of Buffalo, N.Y., described the application of the old Deacon process to new methods for producing chlorinated benzene, which is later converted to phenol. Normally, he said, when chlorine is added to organic chemicals like benzene, hydrochloric acid is formed as a by-product and half the chlorine is lost. By use of the old Deacon process, the by-product hydrochloric acid can be converted back to chlorine with the use of air.

These reactions are now carried out in a single step by passing chlorine, air and the benzene through tubes containing newly developed catalysts, which permit operations at temperatures below 500°F.

Advances at Cornell

THE New York Cornell Laboratory has revealed an important refinement of microchemical analysis, developed by Dr. G. H. Ellis (Plant, Soil and Nutrition Laboratory). Depending upon the reaction of cobalt and nitroso-cresol, the method gives a brilliant purplish brown effect in the ultra-violet range by colorimetry and permits the determination of cobalt when it represents only one-thousandth of a microgram in about 5 g. of water.

Another important development at Cornell has been the adoption of a synthetic resin exchange absorption process which is stated to produce better "distilled water."

New Zealand's Chemical and Mineral Industries

A Potential Market for British Products

THE development of New Zealand's mineral and other natural resources and of her manufacturing industries, including chemical fertiliser, pharmaceutical and plastics production, are among the subjects dealt with in "Economic and Commercial Conditions in New Zealand," by Mr. R. Boulter, formerly U.K. senior trade commissioner in that Dominion (HMSO, 3s.). The small to moderate production quantities recorded suggest there is further scope in New Zealand as a potential market for British chemical, and in some instances mineral, products.

Steel Plans

The establishment of an iron and steel industry based on the deposits of iron ore (limonite) at Onekaka, in the northwest of the South Island, was one of the items in the scheme for industrial expansion prepared by the Government before the war.

Early in 1949 experiments were commenced, using an electric furnace, upon the smelting of iron sands of which large deposits exist in Taranaki Province in the North Island. The object was to test the possibility of extracting titanium as well as iron on an economic basis. These tests will include also experiments with deposits of iron sand of a different nature which are found on the west coast of the South Island. In this case the sands consist of mixtures of magnetite, limonite and garnet.

Notwithstanding the lack of indigenous raw materials, the expansion of secondary industries has been an outstanding feature of the economy of New Zealand during the last 10 years. Comparative figures of some chemical productions are :—

	Number of factories	Number of persons engaged	Value of production £'000
Chemical Fertilisers			
1938-39 ...	8	932	1,823
1946-47 ...	9	1,109	2,583
Chemicals and Patent Medicines			£'000
1938-39 ...	66	657	668
1946-47 ...	114	1,363	2,324

New Zealand's total output of coal in the first 11 months of 1948 (the latest figures available when the report was written) was 2,555,000 tons. With the development of her manufacturing industries since the war, however, the necessity for increasing imports of coal appears to be indicated. In the immediate pre-war years imports of coal were fairly steady at about 110,000 tons a year, derived almost entirely from Australia. Australian shipments declined in subsequent years and have ceased since 1944. Considerable tonnage has since then been imported from the U.S.A. and South Africa.

Production of pressed glassware in New Zealand, started some years ago, is to be expanded both in volume and in the range of goods manufactured.

Development of the plastics industry has been very rapid. In 1948, eight injection moulding-machines were in operation and over 200 compression presses. Apart from numerous articles of everyday use, manufacture has been extended to electrical switches and fittings, door handles and other builders' hardware, laminated staves for beer casks, garden hose and the fabrication of imported plastic sheet.

In the chemical industries, zinc oxide, white lead, metallic naphthenates for the preservation of timber, etc., liquid driers for the paint and printing ink industries, and preparations for waterproofing cement are all new products. An additional factory has started the manufacture of matches. A large expansion has taken place in the production of toilet and pharmaceutical preparations. Fish liver oils and linseed oil are being made from locally produced materials.

The scope of scientific research undertaken, and the number of organisations engaged in these activities, have expanded considerably in the last few years. A new departure is the establishment of a section of the Dominion Laboratory to study vulcanological chemistry in the thermal regions with a view to the possible utilisation of power from thermal sources.

Imports from U.K.

The total value of imports into New Zealand from the U.K. under the heading of drugs, chemicals and manures in 1948 was £1.8 million, but in few cases were imports of individual items of great importance.

Imports of antiseptics from the U.K. accounted for £91,691 out of a total of £184,182 in 1947, and for £152,172 out of a total of £223,933 in 1948. Competition is encountered from Australia and the U.S.A. Licences for imports are valid for importation from all Commonwealth countries except Canada. They are not, however,

valid for imports of penicillin or streptomycin.

Total imports of insecticides and disinfectants were valued at £326,528 in 1947 and £274,767 in 1948. The U.K. supplied sheepdip to the value of £199,343 in 1947 and £134,710 in 1948, the only other imports being small quantities from Australia.

Of insecticides and fungicides for agricultural purposes the U.K. supplied rather less than half the total imports, viz.: £30,826 out of £72,867 in 1947 and £21,217 out of £48,496 in 1948. Australia and the U.S.A. were the other sources of supply. Imports from the U.K. of disinfectants not elsewhere specified, were valued at £12,062 in 1947 and £35,700 in 1948, the total imports in these two years being £17,088 and £45,514 respectively.

The allocations of exchange for 1949 provided for imports on the same basis as for 1948 of sheepdip and weed and scrub killing preparations, and were valid for imports from all Commonwealth countries except Canada. Insecticides and fungicides for agricultural purposes are a "control" item. The import figures include materials for manufacture as well as complete products. There is a small production of sheepdip in New Zealand and a much larger manufacture of insecticides.

70 Per Cent of Dyes

Imports of dyes in manufactured form were valued at £140,446 in 1947 and at £146,531 in 1948. In both years the U.K. supplied 70 per cent of the total imports, followed by Switzerland as the next largest supplier. Part of the trade formerly held by Germany has been secured by Switzerland. Comparative import figures were:—

	1947 £	1948 £
Total imports of manufactured dyes	140,446	146,531
From U.K.	98,450	108,427
,, Canada ...	12,160	90
,, Switzerland ...	24,289	35,392
,, U.S.A. ...	4,193	1,825

There is no manufacture of dyestuffs in New Zealand and most dyes are imported in manufactured form. Dyers in New Zealand, particularly those in the textile trades, have a predilection for stainless steel vats, with the result that dyes suited for use in such vessels find a readier market.

Imports of other drugs and chemicals into New Zealand from the U.K. include a wide range of both fine and heavy chemicals in comparatively small quantities. They are required as materials for use in a number of industries, e.g., glass, soap, food and aerated waters, pharmaceutical and toilet preparations, electro-plating, welding, plastics, paint and varnish, dairy factories, freezing works, woollen mills, tanneries, etc.

Sodium Products

Total imports of common salt amounted in 1948 to 1,017,000 cwt. valued at £251,981. Of this quantity the U.K. supplied 537,000 cwt. (value, £127,893) and Australia 430,000 cwt. (value, £93,359). The pattern of imports in the previous year was similar. Other 1948 imports of some importance from the U.K. were sodium carbonate, 203,000 cwt. (value, £90,000); sodium sulphide, 36,000 cwt. (value, £50,000); and caustic soda, 37,900 cwt. (value, £48,000). Competition in the supply of chemicals comes from Australia and the U.S.A.

Under the heading of medicinal preparations, which includes drugs, chemicals and druggists' sundries as well as proprietary medicines, total imports are shown as £443,783 in 1948, of which the U.K.'s share was £298,007, Australia £51,515, and the U.S.A. £53,563. Consumption of medicine in New Zealand has been high for many years, and has expanded under the social security scheme which provides medicines free in many cases. A much larger proportion of requirements is now supplied from local manufacture. A number of overseas firms, from the U.S.A. and Australia, as well as from the U.K., have established factories in which many well-known proprietary medicines are now produced and sold under the same trade marks as those in use in the parent countries.

At present, cement for building purposes is very scarce and strict control is exercised over its use. The capacity of the three works in New Zealand is being enlarged with a view to providing sufficient for the country's requirements.

The principal item among imports in the paints and minerals group consists of dry colours which are required as materials by the local manufacturers of paints. Imports of dry colours in 1948 totalled 191,790 cwt. valued at £837,414, of which the U.K. supplied 85,600 cwt. valued at £450,000. Other forms of paint imported from the U.K. in 1948 were white lead ground in oil, 2600 cwt. (value £21,000) and paints mixed ready for use, 2700 cwt. (value £19,000).

Australian Scientific Glassware

Items of industrial scientific glassware which Australia previously imported are now being manufactured in Perth, Western Australia. The range includes stopcocks, specific gravity bottles, pipettes, funnels, nebulisers, condensers, filter pumps and blood transfusion glassware.

MECHANICAL DRYING METHODS

Characteristics of Some Modern Processes

From A CORRESPONDENT

IT is not very long since the majority of drying operations in industry were conducted with home-made driers and by slow and cumbersome processes. It is in fact in the past quarter of a century that drying has entered a new era. No longer is it a primitive necessity appended to other processes, but an operation with economic importance in its own right.

Cause and Effect

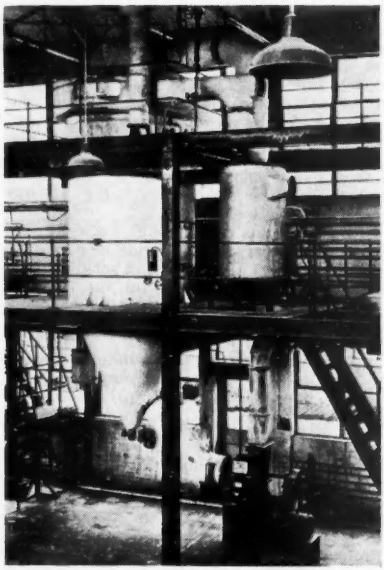
Drying is required for many reasons. The obvious ones are the reduction of weight and volume that follows moisture removal, the greater biological stability of many organic or natural materials when stored in dried forms, and the removal of solvents from main products or from residues after extraction operations. The removal of moisture from materials will in many cases give them more suitable physical properties for consumer-uses; certain waste organic materials, for example, become suitable conditioners for compound fertilisers when naturally associated moisture is removed.

Most drying operations are concerned with the removal of water rather than of other liquids, and the overwhelming majority are based upon evaporation, of which the spray pond and the solar salt pan of the Far East are the large-scale examples. Among the several alternatives, absorption, using a deliquescent solid as the agent, will remove water from immiscible liquids, will serve to dry gas or air, and is occasionally valuable in conferring a "dry" physical condition upon materials which could not be heat-dried. Inconveniently wet chemicals can be brought to a dry state by mixing with anhydrous sodium sulphate, into which the free water passes as water of crystallisation. This obviously can be applied only where the anhydrous agent is an inert and permissible adulterant of the end-product.

Variety of Processes

Adsorption methods of removing moisture have made great use of silica gel and activated alumina for gas and air drying.

Freeze-drying—refrigerative cooling or freezing—of gases causes moisture condensation as droplets which are separated by mechanical means; liquids such as fruit juices lend themselves to a similar process, the ice crystals being removed by mechanical means, such as centrifuge spinning.



[Courtesy, Bamag, Ltd.

Spray drying plant for soap powders

The main drying methods are, however, still based upon evaporation. The engineering tendency to-day is away from standard or universal types of driers and towards the development of drying plants specially designed for particular tasks.

A number of factors have to be considered in designing a drying process. How much heat treatment—for how long and to what temperature limit—will the material stand without impairment of essential qualities, *e.g.*, taste, colour, nutritional trace values, or chemical composition? What is the state of subdivision of the material? Does it become sticky during the drying process? How much moisture must be removed for the drying operation to achieve its purpose? Is batch or con-

tinuous drying required? What is the refinement value of the drying operation worth What fuels or heat-sources are available? What are the general atmospheric conditions in which the drying plant will operate?

Where the material is not heat-sensitive up to moderate steam temperatures, the old standard driers still operating in many factories can be employed. Here the material is "paddled" through a fixed steam-heated cylinder by moving arms and vanes. The rotary kiln type of drier is partly a development from this older type. Here the cylinder itself revolves. It is usually slightly inclined. Hot air and gases pass through the cylinder while the product moves more slowly through it.

This type of drier is awkward to use for materials which tend to stick to the sides, or for very bulky materials. The length of such drier, their inclination and speed of rotation, and the rate of feeding the product depend upon the drying "load." The drying power of the hot gases, from a furnace or air-heating plant, has to be limited by the permissible temperature for the product; but some flexibility of drying power can be secured by adjusting the speed of the fan pulling the gases or air through the cylinder.

Simple Method

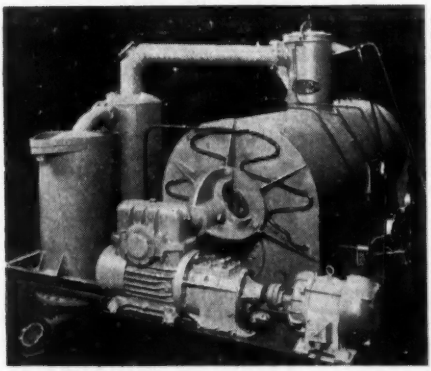
Another well known class of driers is the simple cabinet type. An insulated container with shelves is loaded with trays holding thin layers of the product. Heat is supplied by steam coils, electric units, or the circulation of flue gases, etc. The heat system again necessarily depends upon the tolerance of product, and where a sensitive upper limit or upper range exists, thermoplastic control devices are required. Essentially a batch drier, this type of plant is suited to materials which are produced at hundredweight rather than ton rates.

Modern Developments

The principle has been expanded, however, and continuous operation is possible with the tunnel drier and the moving belt drier. In tunnel driers rack of trays are loaded at one end of the drier and removed dried at the other; the moving belt drier substitutes a suitable continuous belt for the tray and shelf or rack system. In general, the cost of moisture removal, compared with other drying systems, is low for these modifications of the cabinet type drier.

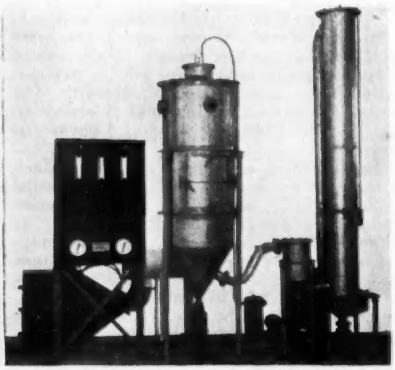
Vacuum drying or drying at low pressure is the common practice when the material is heat-sensitive, and for liquids the ordinary vacuum evaporators of the batch or continuous climbing film type are widely used. Shelf and tray cabinet driers of a "vacuum" type are used for solid materials; the heat supply is commonly provided by transfer through the hollow bottoms of the trays. The vacuum and the removal of the evaporated water is maintained by a powerful pump and condenser system.

The initial and running costs of this type of drier are high and only relatively costly materials, such as pharmaceutical or refined food products, can be economically dried in them. It is said that moving



[Courtesy, W. J. Fraser & Co., Ltd.

Mild steel, horizontal, steam-jacketed vacuum drier



[Courtesy, Kestner Evaporator & Engineering Co., Ltd.

Laboratory size patent spray drier No. 2 with compressed air atomisation

belt and tunnel driers of a vacuum type can be expected as future commercial plant developments.

Another prominent class of drier, the spray drier, owes its early development to the dairy industry. In a sense, the method might be called "flash drying." An atomised solution or suspension or even a slurry is projected downwards into a large vertical container where it meets streams of hot air or gases. The droplets are rapidly dried and fine particles, the size of which can be fairly closely regulated, fall to the bottom or are collected in the cyclone of the exhauster air outlet.

The spray drier is ideally suited for producing re-constitutable dehydrated products for the physical condition of the particles produced is excellent. High vacuum freeze drying is usually applied to such materials as blood plasma and pencillin but in Denmark the spray drying technique has been developed so that it may be operated under sterile conditions for these materials.

Roller or drum driers can be used either at normal pressures or under vacuum, producing a flaky end-product. The principle is the carrying of a thin film of the liquid solution, slurry, or paste on the surface of a slowly rotating and internally heated roller. The film gradually becomes solid and is scraped off by a fixed knife edge. The speed of rotation must be set so that the solidifying film is not kept on the heated roller any longer than is necessary to attain a suitable dried condition.

A two-roller system, in which the rollers rotate in opposite directions, and the liquid is fed into the V-trough formed between the rollers, is one of the commoner forms of this type of drier. Roller driers have been operaed for many years, especially in the paper, soap flake, and milk products industries. It is possible to enclose roller-drying in high vacuum containers, but on the whole this adaptation has proved costly both in outlay and operation.

A fairly new type of continuous drier consists of a vertical series of circular trays rotating on the same central shaft. Stationary arms move the material from the centre of the tray to the perimeter, and, on the tray below, from the perimeter to the centre, and so on in alternate series. Thus the material descends from tray to tray. Hot air is supplied from the centre and is fan-controlled, but each tray acts as a baffle; the distribution of moving hot air over each tray is therefore very even. This system dries wet materials efficiently for a fresh surface is exposed each time the product drops to another tray. It is a further reminder to drier designers of the critical importance of maximum surface exposure in securing economical drying.

£169,000 Crown Grant for Anodising Processes

A PAYMENT of £169,000 has been made by the Crown to Alumilite & Alzak, Ltd., for inventions and secret processes used during the war for the protection of aluminium and aluminium alloys, particularly in the construction of aircraft. The award has been made without reference to the Royal Commission on Awards to Inventors.

The Ministry of Supply Patents Branch in its letter to the firm described the award as being for "techniques and processes and information generally known as 'know-how'." Mr. A. J. Milne, managing director of the company, has since stated that the award recognises the firm's co-ordination of available information, much of it before the war. He recalls that there was no one individual "inventor."

The management caused the inventions of several people to be brought together under the auspices of the company and during the war made the collated information available to the Crown.

The processes are anodising and ancillary treatments and at the beginning of the war they are stated to have prevented a serious hold-up of production by enabling industry to do without imported chromic acid.

After treatment, the skin of the aluminium is an oxide which chemically is identical with a sapphire and can be made so hard that it will cut glass.

The 16 patents made available to the Crown and used by thousands of Crown contractors were these: Sulphuric glycerine anodising, black dyeing, boil seal, nickel seal, nickel and cobalt seal, photographic images, sulphuric acid anodising, colouring with permanganic acid, impregnation with corrosion inhibitors, air agitation, boil seal after dye with corrosion inhibitors, sulphuric and oxalic anodising, photographic scales, boiling dye bath, weight controlled anodising, anodising pistons.

MODIFIED TERPENE RESINS

Special Suitability for Printers' Inks

From A SPECIAL CORRESPONDENT

INCREASING attention is being given to the uses of modified terpene resins in printing ink formulations. These resins include such products as rosin-derived alkyds, modified esters of rosins, glycerol esters of rosin, maleic alkyd-modified rosin ester, pentaerythritol esters of rosin, resinous terpene polybasic acid and terpene modified phenolics. The last are the latest additions to the range and they are of great value for extremely fast drying inks.

These terpene phenolics provide the ink manufacturer with the further advantages of light colour, high uniformity from batch to batch and increased speed of incorporation in vehicles. For heat-set inks the phenolics are available with a high melting point, low viscosity, excellent solubility in petroleum solvents and, moreover, they possess a fast solvent release.

Good Oil Solubility

Special terpene modified phenolic resins are being made for use with lithographic inks. Their high viscosity makes them useful in bringing low viscosity oils up to litho varnish viscosity. Good oil solubility eliminates the necessity of high temperature cooking. Their high melting points ensure a fast dry.

Rosin-derived alkyds are water-white, balsamic solid resins having a softening point (Hercules drop method) of 56° C. and a specific gravity at 25° C. of 1.020. These resins can be used in combination with non-drying, oil-modified phthalic alkyds. They are compatible with nitrocellulose, ethyl cellulose, polyvinyl chloride and natural and synthetic rubber.

Their advantages include alcohol resistance, solubility in ordinary lacquer solvent and a resin partly self-plasticised in its synthesis.

Modified esters of rosin suitable for printing ink formulations are pale, hard, tack-free solids. They are soluble in aromatic and aliphatic hydrocarbons, esters and isopropyl alcohol. Although essentially made for use in nitrocellulose lacquers, the modified esters of rosin find important applications in many types of printing inks.

The glycerol ester of rosin is a pale coloured resin possessing good solubility in aromatic and aliphatic hydrocarbons, esters, ketones and carbon tetrachloride. It is miscible and compatible with many film-forming resins and rubbers. A high grade ester gum manufactured by Hercules Powder Co., Ltd., has an acid number of 7, specific gravity of 1.095 at 25° C. and softening point 91° C.

Adhesive Qualities

Maleic alkyd-modified rosin ester is a hard, pale-coloured resin which when compounds with film-forming materials or drying oils produces hard, glossy finishes with good adhesive qualities. It is readily soluble in aromatic hydrocarbons, ketones and esters and all drying oils.

Modified pentaerythritol esters of rosin are well known all-purpose resins for the varnish trade. Typical esters have an acid number of 15; 0.64 per cent free hydroxyl; iodine number 169; thiocyanate number 42 and softening point (ring and ball method) 128° C.

In the preparation of varnishes they are most useful with soft oils or mixtures of soft oils and tung oil and they can be used with long oil alkyds to improve hardness, wash resistance and stability.

Common Requirements

The requirements of resins to be used in printing ink formulations vary from type to type, but some of them are common to all and can be generally summarised as follows:—

1. Light or pale colour: dark resins interfere with ink making and are suitable only for newsprint, where the chief quality of an ink is extremely fast drying.
2. Uniformity of quality: this is of considerable importance as printers work to a tight schedule and a great deal depends on the speed of drying. Variations can cause serious dislocation of work.
3. Low acid number, so that resins have the minimum effect on reactive pigments.
4. Good solubility in oils and petroleum solvents and fast solvent release.
5. High melting point to ensure a fast dry ink.

DIHYDROSTREPTOMYCIN

Some Advantages Over the Parent Substance

INFORMATION published recently on the progress of British streptomycin (THE CHEMICAL AGE, 62, 251) is supplemented by the release this month of a booklet, "Streptomycin and Dihydrostreptomycin," by Glaxo Laboratories, Ltd.

Some notes on the production of the latter substance explain that dihydrostreptomycin is prepared synthetically by the catalytic reduction of streptomycin. Like the parent substance, dihydrostreptomycin is a base capable of forming salts, of which the hydrochloride and sulphate are the commonest.

Considerable importance would appear to attach to the company's claim of lower toxicity of dihydrostreptomycin. There is, it is stated, a growing amount of evidence that this chemical modification of streptomycin considerably reduces the drug's toxicity, without altering its antibacterial activity or its therapeutic efficiency.

Thus, by using dihydrostreptomycin the ordinary course of treatment may be prolonged and the dosage increased without neurotoxic symptoms appearing. It has been stated that a total course involving as much as 90 gm. of the drug can be injected in some cases without vestibular dysfunction occurring.

When dihydrostreptomycin was first introduced, intrathecal administration of the compound was not recommended. It is, however, apparently safe, states the report, to administer dihydrostreptomycin sulphate by the intrathecal route in doses of 25 to 50 mg and it has recently been given intrathecally in full dosage without any untoward effects. These findings apply only to the sulphate and should not be taken as applicable to the hydrochloride until more information about that compound has been obtained.

Mixtures of streptomycin (calcium chloride complex) and dihydrostreptomycin sulphate are chemically incompatible, as insoluble calcium sulphate will be formed. For this reason, after either compound has been used intrathecally a change to the other should not be made without the lapse of sufficient time to allow the first to disappear from the cerobrospinal fluid.

Dihydrostreptomycin sulphate appears to cause less pain on intramuscular injection than does streptomycin (calcium chloride complex) and this is attributed more to the absence of calcium chloride than to the nature of dihydrostreptomycin itself.

Both compounds have, with a few important differences, similar properties; they are equally potent and stable and are effective against the same range of organisms. Unfortunately, bacterial resistance to both drugs is said to be acquired with equal facility; development of resistance to the one involves simultaneous development of resistance to the other.

Natural Gas Source of Canadian Sulphur?

CANADA could become nearly self-sufficient in sulphur if Alberta allows the export of natural gas to the Pacific coast, it is contended in a brief submitted to the Alberta Petroleum and Natural Gas Conservation Board. The board, in Calgary, is hearing an application to permit the carriage of gas from Westcoast Transmission Co., submitted by Alberta Interfield Gas Lines, Ltd., which proposes to build a grid system to connect various Alberta fields to the gas outlets.

The brief observes that two of Alberta's largest potential export fields—Jumping Pound, near Calgary, and Pincher Creek in the southern foothills—produce gas containing hydrogen sulphide.

It proposes that sulphurisation plants should be constructed to use the sulphur in the waste hydrogen sulphide gas. It estimates annual production would be 243,000 tons.

In 1947, Canada imported 353,000 tons of sulphur from the U.S.A.. It sold on the eastern Canada market at $20 a ton. The company's proposals indicate that the average production cost in Alberta would be $2.48 a ton and even with freight rates ranging from $5.42 to $16.40 a ton, Alberta sulphur could compete on the eastern market.

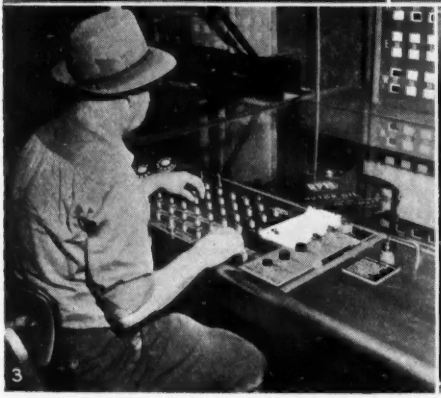
Alberta has plenty of gas for export, Dr. T. A. Link, formerly chief geologist for Imperial Oil, Ltd., told the board. He said in five years Alberta will have proven reserves of 10 trillion cu. ft. of gas. "Less than half that amount would do the Pacific coast for the next 30 years."

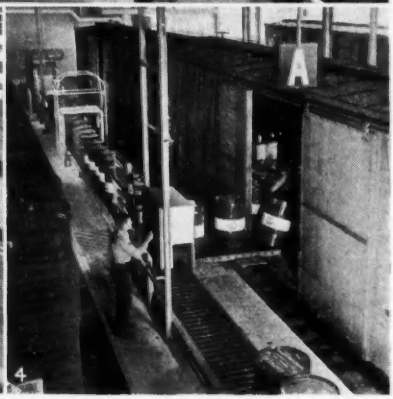
MECHANISED PLANT OPERATION

Advanced Applications for Grease and Lubricants

PROBABLY the most advanced application of the principle of securing unimpeded flow of processing, packaging and dispatch in an industry closely related to chemical production is represented by the grease plant recently opened by the Standard Oil Company of California. The installation, at Richmond, California, comprises under one roof (7½ acres) equipment to produce 38 million lb. of lubricants per year and 1½ miles of automatic conveyors which can handle 7600 barrels every eight hours. Lubricants, processed at three levels making full use of gravity feed, are pumped to portable filling and weighing machines, moved on gravity or power rollers and mechanically crated and loaded. Automatic action characterises most departments and labour requirements are smaller than those of any plant of comparable size.

(1) *The filling of 14-gal. oil drums by weight control*
(2) *Dispatching drums by roller conveyors*
(3) *A single operator controls the whole conveyor system, the press buttons operating counters and recorders*
(4) *Drums at the railway dock are mechanically loaded into wagons*





Noble Metal Catalysts

All-Round Efficiency of Rhodium-Platinum Alloys

THE activity of the platinum group of metals and silver in promoting oxidation and reduction processes has been recognised for many years, but it was not until the beginning of the present century that the chemical industry became a major consumer of noble metals for use as catalysts.

For some time, large-scale industrial application of noble metal catalysts was confined to contact process sulphuric acid plants. Other industrial processes have since come into use requiring platinum, rhodium, palladium and silver in considerable quantities, and the number and volume of chemical products manufactured by their aid are continually increasing.

Origins

The principal current uses of these catalysts and the forms in which they are prepared for various industrial processes are described in a booklet " Noble Metal Catalysts " just issued, as publication 1680, by Johnson, Matthey & Co., Ltd., London. This usefully summaries the technological background of the development of platinum gauze catalysts and describes the sort of considerations which have helped to create the present highly developed forms.

It recalls that the abundant supply of low-cost pure ammonia resulting from the development of the processes of ammonia synthesis led to a tremendous expansion of the ammonia oxidation industry, particularly in the period 1920-1930, and it is now the source of almost the whole world's output of nitric acid.

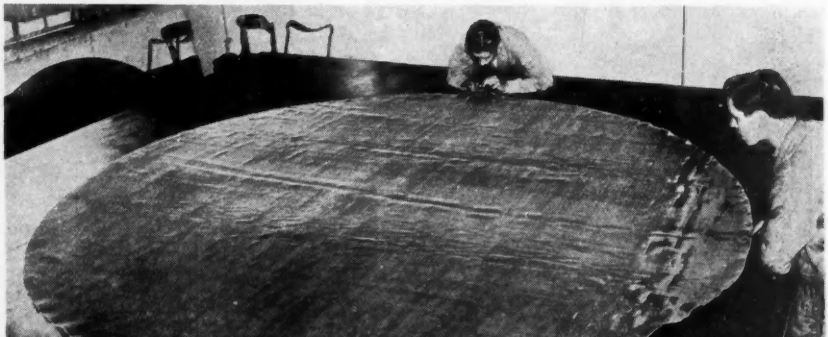
Although base metal oxide catalysts have been brought into use during periods of platinum scarcity, no catalyst as efficient as the platinum gauze pad has been developed, and the process remains fundamentally that which Ostwald devised, in 1902.

The most important modification to the process has been the introduction by the Du Pont Company of oxidation at elevated pressure, usually 6 to 7 atmospheres[1,2].

By this method the conversion of nitrogen oxides to nitric acid is greatly facilitated, but the efficiency of oxidation is reduced, so that to obtain a satisfactory yield it is necessary to work at higher temperatures than in an atmospheric pressure plant.

The increase in operating temperature is accompanied by a reduction in the life of a platinum gauze catalyst, which is very

(*continued on page* 406)



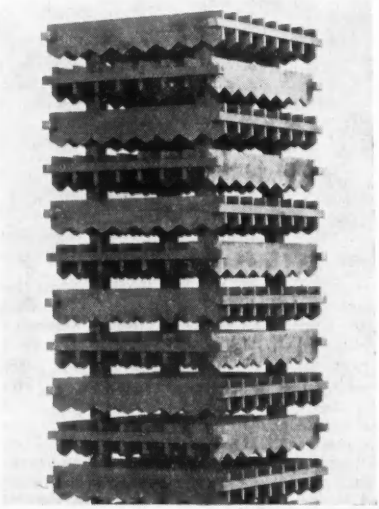
[Courtesy of Johnson, Matthey & Co., Ltd.

The closest scrutiny is given to exclude the possibility of irregularities in the rhodium-platinum mesh catalysts, of which recent examples have been nearly 3 metres in diameter

IMPERVIOUS CARBON PRODUCTS

New Resistant Material for Plant Components

PROLONGED studies of the physico-chemical behaviour of common carbon material have resulted in the development of a new carbon and graphite promising to have wide usefulness for chemical engineering components, where inertness and relatively high mechanical properties are essential.

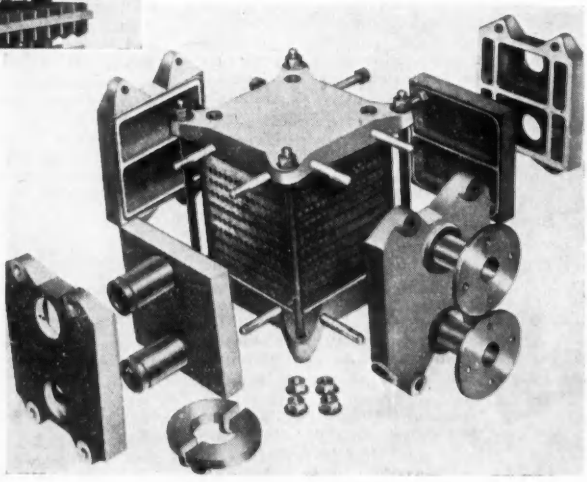


The characteristic of the new materials (Delanium) upon which are based special properties not common to previous carbon products are their homogeneity. The production method disposes of the necessity for an extraneous binder such as used in forming industrial carbon appliances from calcined coke or its equivalent. That method, because of the partial dissipation of the binder during firing, may entail varying degrees of porosities and diminished mechanical strength. Residues of such binders have not carbon's characteristic resistance to high temperatures and chemical attack.

Increased Density

The production of the new carbon and its graphitic form have been described by Powell Duffryn Research Laboratories, which discovered and developed it. The production method, in outline, is as follows:—

Coking coal is very finely ground and to this small quantities of swell-inhibiting materials are added. The mixture is pressed or extruded to the desired form and is fired in a controlled atmosphere in a temperature cycle giving maximum



Right: Components of a cubic heat exchanger, of which the central perforated graphite block combines the corrosion resistance of familiar graphite tubes with very much greater strength. Above: The hard, wettable carbon is used to make tower packing elements formed to provide intimate contact between gas and liquid

shrinkage without distortion. After firing, the volume shrinkage may be as much as 45 per cent.

The porosity consequent on loss of volatiles during firing is compensated for by the high volume shrinkage, leaving a final product of low porosity, which, since it consists substantially of carbon-carbon linkages is mechanically strong.

By a suitable choice of coals, swelling-inhibitors, firing atmospheres and temperatures, a variety of Delanium carbons having a wide range of mechanical, thermal, electrical and chemical properties can be produced.

With appropriate heat treatment, this carbon graphitises, as do others, and it is stated that products with a wide range of physical, chemical and electrical properties are obtained.

One of the promising uses made by the Powell Duffryn group of the graphite form is to provide a cubic heat exchanger in which the exchange takes place in a honeycomb carbon block, which dispenses with tubes. Strong and compact, this is stated to be capable of an overall conductance (steam to water) of 500 B.Th.U. sq. ft. hr./F°.

The space economy is implicit in the fact that a conducting area of 50 sq. ft. is afforded by a perforated 15 in. cube of Delanium.

The carbon in a special form has been successfully employed to form a new type of packing for scrubbing and similar towers, chemically resistant and with good wetting properties. Another very appropriate use of the extremely dense carbon is to form tiles to line chemical vats, etc.

Some of the basic characteristics of the two commercial materials are stated thus:

Property	Delanium Carbon	Delanium Graphite
Apparent density (ash-free basis)	1.55	1.70
Electrical resistance in ohm/in.	.007	.0007
Thermal conductivity in B.Th.U./sq. ft./hr./°F./ft. ...	3	40
Transverse strength in lbs./sq. in	12,000	8,000
Compressive strength in lbs./sq. in.	38,000	20,000
Scleroscope hardness	85	65
Coefficient of thermal expansion	$3.8\times$ 10^{-6}/°C.	$3.8\times$ 10^{-6}/°C.

NOBLE METAL CATALYSTS

(*continued from page* 404)

marked under the conditions necessary for high pressure operation.

This circumstance led to the introduction of rhodium-platinum alloys containing up to 10 per cent of rhodium, which have a considerably lower high-temperature loss rate than has pure platinum[3].

At the present time, gauze woven from 10 per cent rhodium-platinum wire is practically universal in high pressure plants. It is arranged in multi-layer catalyst pads of 20 to 30 individual nets, which enable a very large quantity of ammonia to be oxidised in a relatively small converter[4].

The benefits gained by the presence of rhodium in the catalyst diminish as the working temperature is lowered, and in plants working at atmospheric pressure a lower content of rhodium, generally about 5 per cent, is now customary.

While pressure oxidation is extensively used in the U.S.A., Great Britain and Empire countries, it has not been much adopted in continental Europe. Oxidation at atmospheric pressure, sometimes followed by compression of the oxidised gas before absorption, is generally preferred.

In some cases air enriched with oxygen or an oxygen-steam mixture may be employed as the oxidising medium[5]. The search for operational economy and thermal efficiency has led to the use in the atmospheric pressure plants of large diameter burners: 1, 1.5 and 2 metre diameter circular burners are common[6].

Those most recently built have a diameter of nearly 3 metres. In weaving the very large areas of fine mesh gauze of uniform quality needed to clothe these large converters, a very high degree of skill and technical experience is necessary.

Extensive practical trials of both binary and ternary alloys and of gauze of special weave have been carried out in the ammonia oxidation process. The ternary alloys of rhodium, palladium and platinum are probably the most promising[7], but in general the established range of rhodium-platinum alloys, in plain weave, has not yet been surpassed for all-round efficiency, low loss rate and length of effective life.

References

[1] "Manufacture of Nitric Acid by the Oxidation of Ammonia." G. B. Taylor, T. H. Chilton, and S. L. Handforth, *Ind. Eng. Chem.*, 1931, 23, p. 860.

[2] "Nitric Acid Production." F. E. Warner, *Trans. Inst. Chem. Eng.*, 1946, 24, p. 118.

[3] "Catalysts for the Oxidation of Ammonia to Oxides of Nitrogen." S. L. Handforth and J. N. Tilley, *Ind. Eng. Chem.*, 1934, 26, p. 1287.

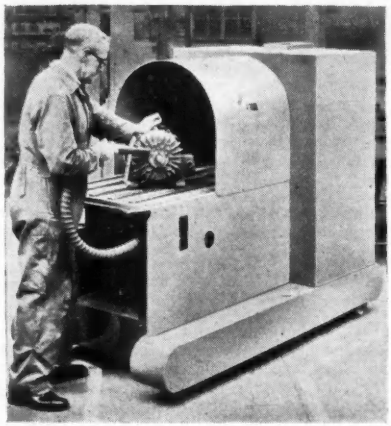
[4] S. L. Handforth and W. E. Kirst, U.S. Pat. 1,919,216 (1933).

[5] "The Production of Concentrated Nitric Acid." A. H. Manning, *Trans. Inst. Chem. Eng.*, 1942, 20, p. 97.

[6] "The German Nitric Acid Industry in the Western Zones." B.I.O.S. Final Report No. 1442.

[7] A. R. Powell, Brit. Pat. 570,071.

Technical Publications



[Courtesy, Dallow Lambert & Co., Ltd.

Problems of dust control confronting maintenance engineers should be simplified by a recent adaptation of the Drymat unit dust collector which draws off the dust by suction instead of the normal "blowing out" method

AUTOMATIC suppression of foam in chemical processes is described in the first of a new series of newsletters now being issued by Elcontrol, Ltd., London, to describe recent applications of its equipment. As soon as the foam reaches a high level probe, the control unit responds and admits a small quantity of the foam-reducing medium by means of a magnetic valve. The foam then subsides, and as soon as it breaks contact with the longer probe the magnetic valve is automatically closed by the control unit.

* * *

DATA on the thermal equilibria of the more important tin-containing binary metallic systems have been summarised in diagram form in a book now obtainable from the Tin Research Institute, Greenford, Middlesex. Needs of the research metallurgist have been borne in mind and a single diagram for each system keeps the information as concise as possible. Diagrams are arranged in alphabetical order according to the element alloyed with the tin, and each is drawn with the percentage of the alloying element increasing from left to right. Supplementary notes are appended, and where available information on the crystal structure is given. Ternary systems are too complex to be adequately represented by one or two diagrams so a bibliography of publications on ternary tin alloy systems is included. The publication has been compiled and produced by L. T. Greenfield and J. S. Bowden.

* * *

REDUCTION of voltage, current and power in a circuit has always been of fundamental importance. The development of constant impedance attenuators and faders to give fine logarithmic control of the output required in transmission networks is described by P. J. Lawson in the January issue of "Technique" published by Muirhead & Co., Ltd., Beckenham.

* * *

A USEFUL work of reference giving practical information about the Belgian chemical industry is the 1950 edition of its directory just published by the Federation of Chemical Industries of Belgium. This describes the organisation of the federation and gives a list of members with their office and works addresses, capital, banking-houses, etc. There are also lists of manufacturers, trade marks employed and a register of products in English, Dutch, German and Spanish.

* * *

THE latest catalogue of its proprietary articles is now available from Evans Medical Supplies, Ltd., as B List (supplementary) January, 1950.

* * *

SOIL building-blocks stabilised with a pectate derived from sisal, developed at the Bulstrode (Bucks.) laboratories of the A.S.P. Chemical Company, and how they are made to conform with the walling requirements of huts for use in tropical and sub-tropical climates, form the basis of an article in the March issue of *The Times Review of Industry* (4, No. 38, 29). Stabilised blocks, placed in trays containing 1 in. of water and sprayed with a hose for several minutes, were stated to be entirely unaffected. As the result of this experiment it was decided to make blocks for the walls of a demonstration hut similar to a type designed by the United Africa Company. The roof (aluminium purlins with a covering of 26 gauge sheeting) was provided by the British Aluminium Co., Ltd.

The Chemist's Bookshelf

THE STORY OF ATOMIC ENERGY. Frederick Soddy. London, Nova Atlantis. Pp. viii-136. 20s.

This book has a much keener appreciation of the dramatic values than most other treatments of the subject. The author claims that he is the sole surviving participator in the origination of the discoveries and ideas which culminated in the bomb and he does not fail to notice the contributions which he made himself to these studies. The whole presentation is forthright and opinions are offered without diffidence. The policy greatly enlivens the clear account of the development of atomic and molecular theories leading up to the discovery of atomic energy.

Prof. Soddy has aimed to make comprehensible to non-scientists a moderately detailed account of the work which led up to some understanding of nuclear structure. He deals with the development of quantum theory, discovery of the nucleus, discusses the significance of the periodic table and thus leads up to the first artificial transmutation. Recalling the circumstances of the manufacture and use of the bombs, he makes a further small contribution to terminology. Once the atomic energy has been set free in quantity, he points out, it is no longer "atomic." It is an-atomic—or to avoid confusion with a biological term—simply "tomic." And this term he uses consistently to describe atomic energy, after its release. The author's acceptance of the "free dissemination" of knowledge theory is complete. Proposals by U.S. scientists for total abolition of war also receive his endorsement.

The book is a replica of articles which first appeared in *Engineering* during 1947 and 1948. Not having been revised, the periodic table given on p. 20 still contains gaps for elements which were announced during 1940. These are the "synthetic" elements not confirmed in nature, but definitely confirmed as present in the uranium fission products (*e.g.*, technetium, No. 43, astatine No. 85 and francium No. 87). The preface, which is, of course, new matter, is incomparably less irritating to read than the main body of text. The whole represents an interesting account for chemists, but the author is probably optimistic in assuming it is intelligible to the general public.—L.B.

THE ART AND SCIENCE OF BREWING. C. A. Kloss. 1950. London: Stuart & Richards. Pp. x + 121. 12s. 6d.

Given here is primarily a concise account of the materials and processes of brewing, written with a minimum of technical elaboration and providing a clear reflection of the current use of science and the scientific method in the understanding and control of brewing. Beginning with a brief history of beer, it deals in 11 chapters with many new aspects of this very old industry. Included are a summary of the activities of research organisations, and biographies of international scientists whose work had a vital influence on brewing technique and scientific development. There are many instructive plates and a bibliography and index.

"Serendipity" and the Scientist

HOPE that the research programme launched by the brewing industry might add not only to results of practical use to the industry but also to basic scientific knowledge were expressed by Sir Edward Appleton at the 29th annual dinner of the Scottish section of the Institute of Brewing held in Edinburgh last week.

The principal of Edinburgh University said that it was a prudent decision to plan long-term research, but he also hoped that the work of their scientists might be characterised by "serendipity." This word, coined by Horace Walpole, meant "the faculty of making happy and unexpected discoveries by accident."

The need for getting new ideas into the industry was emphasised by Mr. M. V. Courage, president of the Institute of Brewing, and particular reference was made to the establishment of the Chair of Brewing and Industrial Fermentation in the Heriot-Watt College (THE CHEMICAL AGE, *62*, 274).

· PERSONAL ·

A WIDNES student, MR. CHARLES VOWLES, aged 26, is one of the 50 selected engineers from Great Britain to visit the U.S.A. for special training under the ECA technical assistance programme. Mr. Vowles is taking a two-year course in chemical engineering at the Institute of Chemical Engineering, Massachusetts. He graduated at Liverpool University in 1944, when he was awarded the William Rathbone prize and Carlton Stitt gold medal. He has been released by I.C.I., Ltd., to undertake his present course.

SIR ROBERT SINCLAIR, K.C.B., K.B.E., president of the Federation of British Industries, was nominated at the meeting of the FBI Grand Council to serve for a second year in office. Confirmation awaits the annual general meeting of the Federation in April.

DR. E. H. T. HOBLYN, who has been secretary of the British Chemical Plant Manufacturers' Association since 1944, has been appointed the director of the association, formerly the office of the late Mr. Norman Neville. Dr. Hoblyn has very actively promoted plant manufacturers' interests and has been their emissary overseas on several occasions since the war.

The British Tar Confederation has announced the appointment of the following officers for 1950: President: COLONEL H. C. SMITH; hon. treasurer: MR. C. E. CAREY. The executive consists of ten representatives nominated by the Association of Tar Distillers, the British Association of Coke Oven Tar Producers and the Gas Council, with a chairman, MR. W. K. HUTCHISON, and two vice-chairmen, SIR WALTER BENTON JONES and MAJOR A. G. SAUNDERS.

Among the 13 recipients of awards of honorary degrees approved by the Senatus Academicus, to be presented at Edinburgh University at the graduation ceremony in July, is PROF. E. N. DA C. ANDRADE, director of the Royal Institution, and formerly occupant of the Quain Chair of Physics, London University.

A research studentship awarded by the Textile Institute in 1947 to MR. PHILIP ACKROYD, of Doncaster, has been renewed for a further year to enable him to continue research work at Leeds University. Mr. Ackroyd, who is a research chemist at British Bemberg, Ltd., Doncaster, is investigating the spinning and stretching conditions necessary for the production of strong cuprammonium yarns. In a personal item on page 378 of our issue dated March 11, MR. R. G. OVERSBY was mistakenly stated to have served as hon. secretary of the Textile Institute's Yorkshire section since 1946. He served in that office from 1942 onwards.

Members of the West Riding section of the Society of Dyers and Colourists heard an address in Bradford on March 9 by PROF. NILS GRALEN, one of Sweden's foremost scientists, on his recent discoveries on the "Cuticle of Wool." Prof. Gralen, who is 38, has been director of the newly-established Institute for Textile Research since 1944, and two years ago was given a professor's chair in textile chemistry at the Chalmers Technical University. His research has been concerned chiefly with the structure and physical behaviour of textile fibres.

The following officers have been reappointed by the Food Group of the Society of Chemical Industry for the 1950-51 session:—Chairman, MR. A. L. BACHARACH; vice-chairman, DR. E. B. HUGHES; hon. treasurer, DR. J. R. NICHOLLS; hon. secretary, MR. L. H. C. BARTON. Nominations for five places on the members' committee, vacant owing to retirements, should reach the hon. secretary by March 20.

The board of National Titanium Pigments, Ltd., has appointed MR. P. D. O'BRIEN and MR. B. E. A. VIGERS as managing directors of the company, and MR. W. WOODHALL, a director, as general manager.

OBITUARY

DR. ARTHUR DEMPSTER, aged 63, atomic scientist, whose name is connected with the discovery of Uranium 235, died at Stuart, Florida, U.S.A., on March 12.

The death has taken place at Bebington, Cheshire, of MR. ROBERT MCLEAN, formerly secretary of Lever Bros. (Port Sunlight), Ltd.

The death has occurred, at his home in Glasgow at the age of 70, of SIR FREDERICK STEWART, who was chairman of Kelvin, Bottomley & Baird, Ltd., scientific instrument manufacturers, Thermotank, Ltd., and other companies.

PARLIAMENTARY TOPICS

Technology in Universities

PROBLEMS of higher technical education in Britain were debated in the House of Lords on Wednesday, when Lord Calverley, opening the discussion, said that the Ministry of Education should "let people known exactly where the technical colleges stood." There were 27 technical colleges in the country, of which 10 were in the London area, within the ambit of the University of London. It is high time, he continued, that the Government stated definitely that it is prepared to give graduate status to these colleges.

Lord Caldecote agreed that the Ministry of Education should define its proposals, but could not agree with the granting of indiscriminate degrees. Suggestions had been made that the engineering faculties should be removed from the universities. That, he thought, would be wholly misguided.

Lord Darwen (Lord-in-Waiting), replying, said there was no evidence to support the view that our technology training courses were inferior to other countries'. Considerable expansion was needed and some reforms were overdue, although facilities had been increased and the number of technologists trained since the war had been doubled. These colleges were not regarded by the Ministry of Education as Cinderellas in education.

Security of Secret Documents

REPLYING to a number of questions in the House of Commons on the subject of the Fuchs case, Mr. Harold Wilson, President of the Board of Trade, said he thought it unnecessary for him to lay down any special security regulations to cover secret documents, patents, and inventions brought before the National Research Development Corporation. In the unlikely event of such documents coming before the corporation, the normal security arrangements of the departments concerned would be applied. Answering Mr. Baker White, who suggested that Soviet agents had derived a considerable amount of useful information from non-secret documents which came before the Canadian Research Council, Mr. Wilson said that all necessary security arrangements for the corporation had been considered and responsibility must rest with the departments concerned with placing documents before it.

LETTERS TO THE EDITOR

"Sophistication" of Foodstuffs

SIR,—Your article on "Present Trends in Baking Research" in your issue of February 11 surely answers itself. As long as we are not *completely* certain that polyoxyethylene stearate, DDT and other chemicals have not, *in the long run*, toxic effects on the human organism, surely the wise course is to suspend their use until much more prolonged and thorough research establishes their innocuity beyond the shadow of a doubt.

In my own experience as a practical miller I have never found the addition of any chemicals necessary in flour or bread making. The law prohibits sophistication of such foodstuffs as milk and butter, and a good case can be made for the extension of that ban to flour and bread.—Yours, etc.,

C. P. ALLINSON.

The Mill House,
Streetley End,
West Wickham, Cambs.
March 13, 1950.

Standard Measures : Pharmacist's Approval

SIR,—The British Standards Institution, after discussion with the Pharmaceutical Society and the Ministry of Health, have now extended their original specification on measuring cups and spoons to include a standard tea and table spoon for measuring the dose of medicine.

As a pharmacist, may I say how welcome is this recommendation. Apart from the wide difference between the standard cooking spoon and that for medicine, the variation in the size of household spoons, particularly the teaspoon, is considerable and can give rise to inaccuracy of dosage, maybe with serious consequences where a potent drug is concerned.

The public, parents especially, will I am sure appreciate the suggestion of such standardised spoons. I hope that they will soon be available and that every encouragement will be given to use them.—Yours, etc.,

MARY C. ISLIP.

Paddington Green Children's Hospital,
Paddington Green, W.2.
March 10, 1950.

HOME

London Showrooms

Megator Pumps and Compressors, Ltd., have moved their offices and showrooms from Feltham, Middlesex, to 43 Berkeley Square, London, W.1.

Works Fatality

Mr. Thomas Casey, aged 43, of Fernhill Street, Toxteth Park, Liverpool, was killed on March 10 when he fell into a vat of chlorine and water at the African Oil and Compound Mills, 21 Flint Street, Liverpool. Workmates pulled Casey from the tank, but he was dead on arrival at the Royal Infirmary.

Defining Plastic Film Properties

I.C.I., Ltd., has introduced a system of gauge numbers for defining the thickness of Alkathene film. The gauge numbers relate to thickness in thousandths of an inch. Thus, gauge 150 represents a thickness of 0.0015 and yields 20,000 sq. in. per lb.; and, at the other extreme, gauge 1000 is a film of 0.010 in. covering 3000 sq. in. per lb.

Chemical Duty Exemptions

The Treasury has made an order under Section 10 (5) of the Finance Act, 1926, exempting the following articles from Key Industry Duty for the period March 13-June 30, 1950:—*n*-butyl -alcohol, mono chloroacetic acid, dibutyl diethylmalonate (a butyl ester), ethylenediamine, R. phenol synthetic phenol, sodium monochloroacetate (a monochloroacetic salt).

Chemical Society Research Grants

Applications for grants from the research fund of the Chemical Society, for the assistance of research in all branches of chemistry, will be considered in June and should be submitted on the appropriate form not later than May 1. Applications from Fellows will receive prior consideration. Details may be obtained from the general secretary, the Chemical Society, Burlington House, Piccadilly, London, W.1.

Directorate of Scientific Intelligence

The establishment of a Directorate of Scientific Intelligence is provided for in a memorandum published as a White Paper to the Ministry of Defence Estimates for 1950-51. The directorate is described as a development of an earlier arrangement, under which staff engaged in scientific intelligence work were paid by their parent departments, and were associated in the form of a committee. Estimated cost of the directorate is £38,044.

Silica Works Damaged

The power house and generator at the silica works, Pentrefelin, Llangollen, were badly damaged by fire on March 8.

Towards Oil Agreement

Talks between American oil companies and British oil experts on the decision to restrict dollar oil imports are to take place in London at the end of the month, states the Foreign Office.

Small Rise in Coal Output

Coal production in the United Kingdom last week was 4,375,600 tons (4,128,200 deep-mined, 247,400 opencast) compared with 4,338,200 tons in the week ended March 4. Output in the first ten weeks of this year totalled 43,035,100 tons, a rise of 636,900 tons over the same period of 1949.

Standardising Spoons

The British Standards Institution, after conferring with the Pharmaceutical Society and the Ministry of Health, has proposed that medicine tablespoons should hold 1/40th, and cookery tablespoons 1/32nd of an Imperial pint; medicine teaspoons hold 1/160th and cookery teaspoons 1/96th of a pint. These recommendations are designed to permit American and British interchange of recipes.

U.K. Lead Supplies in January

An addition to the January figures of non-ferrous metals (THE CHEMICAL AGE, *62*, 364) relating to the summary of lead supplies in the United Kingdom, has been issued by the British Bureau of Non-Ferrous Metal Statistics. No figures were quoted for Government and consumers' closing stocks at January 31. Totals should have been: Imported virgin lead, Government and consumers' stocks: 55,937 long tons. English refined lead, consumers' stocks: 4193 long tons.

Collaboration by Chemists

The relative solidarity of the British Medical Association was quoted as an example of collaboration which chemists might emulate by Mr. C. B. Woodley, general secretary of the British Association of Chemists, speaking at the annual dinner of the Liverpool section on March 6, at which Mr. G. A. Dunn presided. "Nobody orders the doctors around; the Government hardly takes a step without consulting them," remarked Mr. Woodley. The BAC was determined to improve professional conditions and status.

Next Week's Events

MONDAY, MARCH 20

Electrodepositors' Technical Society

London: Northampton Polytechnic, St. John Street, Clerkenwell, E.C.1, 6 p.m. Discussion: "Recent Developments in Bright Nickel Plating."

Royal Society of Arts

London: John Adam Street, Adelphi, W.C.2, 6 p.m. Cantor Lectures. First of three lectures by Colin J. Smithells (director of research, British Aluminium Co., Ltd.): "The Manufacture, Properties and Applications of Aluminium and its Alloys." (Remaining lectures, March 27 and April 3.)

TUESDAY, MARCH 21

Chemical Engineering Group (SCI)

London: Burlington House, Piccadilly, W.1, 5.30 p.m. H. W. Ashton and G. T. Meiklejohn: "Cost Estimating in Process Development."

Institute of Petroleum

Manchester: Engineers' Club, 6.30 p.m. T. Ellis: "Petroleum in Agriculture."

Incorporated Plant Engineers

Glasgow: 351 Sauchiehall Street, 7 p.m. K. Marwood: "The Use of Electronics in Industry."

WEDNESDAY, MARCH 22

The Chemical Society

Manchester: Engineers' Club, Albert Square, 6.30 p.m. (with RIC and SCI). Dr. H. W. Thompson: "Some Recent Applications of Infra-red Spectroscopy."

Society of Chemical Industry

London: Burlington House, Piccadilly, W.1, 6.15 p.m. (Food Group, Nutrition Panel). "The Nation's Manufactured Foods"—Fourth meeting of series.

Royal Society of Arts

London: John Adam Street, Adelphi, W.C.2, 2.30 p.m. Pope Memorial Lecture. Professor John Read: "Chemistry as an Instrument of Culture."

The Institute of Welding

Enfield: Technical College, 7.30 p.m. W. Mackenzie: "The Application of Welding to Cold-Rolled Steel."

THURSDAY, MARCH 23

The Chemical Society

Liverpool: University, 4.30 p.m. Prof. M. G. Evans: "Photo-excited Electron-transfer Reactions."

The Royal Institute of Chemistry

Dagenham: South-East Essex Technical College, Longbridge Road, 6.30 p.m. R. Slack: "The Chemistry of Some Actinomycetic and Bacterial Antibiotics."

The Plastics Institute

London: Waldorf Hotel, Aldwych Hotel, W.C.2, 6.30 p.m. J. H. Collins: "Protein Plastics."

Mineralogical Society

London: Burlington House, Piccadilly, W.1, 5 p.m. Miscellaneous papers.

FRIDAY, MARCH 24

Manchester Statistical Society

Manchester: Albert Hall, Peter Street, 6.45 p.m. A. Howarth: "Work Measurement."

The Society for Visiting Scientists

London: 5 Old Burlington Street, W.1, 7.30 p.m. Discussion: "Computing Machines and Brains."

SATURDAY, MARCH 25

The Royal Institute of Chemistry

Dartford: 2 p.m. Visit to vegetable parchment mills.

RSA Lectures

AMONG lectures to be delivered at the Royal Society of Arts, John Adam Street, Adelphi, London, W.C.2, is one on March 22, by Dr. John Read, professor of chemistry at the University of St. Andrews, on "Chemistry as an Instrument of Culture." "The Manufacture, Properties and Applications of Aluminium and its Alloys" is the subject of a series of lectures by Dr. C. J. Smithells, commencing on March 20. Mr. Hamid Ali, deputy trade director, Office of the High Commissioner for Pakistan, will speak on "Projected Industrial Development in Pakistan," on April 13, and Mr. W. V. Blewett, of I.C.I., Ltd., will present a paper entitled "Tropical Agriculture" on April 25.

German Exhibition of Chemical Apparatus

The German Chemical Apparatus Society (Deutsche Gesellschaft für Chemisches Apparatewesen) proposes to hold an exhibition in Frankfurt from July 9 to 16, when the products of some 350 German manufacturers of chemical plant, etc., will be on view. Concurrently, meetings will be held by a number of scientific bodies, including the Society of German Chemists and the Chemical Safety Engineers.

OVERSEAS

Malayan Rubber Exports and Stocks

Rubber exports from Malaya during January were 58,780 long tons. Exports in January 1949 reached a peak of 75,568 tons.

92 per cent Titanium

The U.S. Navy's Bureau of Aeronautics has produced, after four years' research, a new lightweight titanium-based alloy, basically 92 per cent titanium, 5 per cent chromium, and 3 per cent aluminium, said to have the strength of steel and great heat and corrosion resistance.

American Chemicals for Austria

The ECA reports in New York that Austria is contemplating buying more than $800,000 worth of chemicals and chemical products and $10,000 worth of non-ferrous ores and concentrates from American suppliers, and $100,000 worth of chemicals and chemical products from Latin American suppliers. Some $300,000 will be spent on coal tar dyestuffs.

New Australian Oil Refinery

The Vacuum Oil Company's new refinery at Altona, Victoria, Australia has produced its first yield of industrial lubricating oil. The refinery cost £A1 million and it will also provide some of Australia's diesel oil, bitumen and petrol requirements. The crude oil distilled at the refinery comes from the company's field at Klamono, Dutch New Guinea.

Joint Library Service in Chicago

Eleven mid-western universities in the United States are reported by Unesco to have pooled their library collections to form a centralised library at the University of Chicago. Research facilities of the universities, which are normally attached to the libraries are being incorporated into the main centre. Transport of books will be made by air.

Infra-Red Spectroscopy

Recognition of the serious shortage in the U.S.A. of people with sufficient training and experience to make full use of infra-red spectroscopy as a research technique is represented by the decision of the Spectroscopy Laboratory and the Department of Chemistry at the Massachusetts Institute of Technology to provide an intensive course in infra-red methods and applications during the Institute's 1950 Summer Session. It will be confined to workers with several years' research experience.

D

New Fatty Acids Plant

A plant for the manufacture of fatty acids, stated to be the first of its kind in Schleswig-Holstein, is to be erected in Utersen with U.S. assistance.

World Rubber Situation

The seventh meeting of the International Rubber Study Group will open in Brussels on May 2, when an examination will be made of the world production and consumption of rubber. Thailand and Indonesia are new members of the group.

Chemical Manures in France

Additional plant for the manufacture of chemical fertiliser, which is being installed at the Roche-la-Molière (France) factory of the Compagnie des Produits Chimiques, is expected to be in production by June, and the present average daily output of eight tons will, it is stated, reach 30 tons towards the end of 1950.

Department for Plastic Films

E. I. du Pont de Nemours & Co., has formed a new film department to be responsible for research, production and sales for all products now handled by the cellophane division of the company's rayon department. The new organisation reflects the great expansion since the war of the activities of the cellophane division.

More U.S. Insecticides

A new plant of the Tobacco By-products and Chemical Corporation, Richmond, Virginia, is under construction at Montgomery, Alabama. It is to specialise in the manufacture of insecticides for cotton, peanut, vegetable and fruit crops of the southern States of the U.S.A. and production is expected to start early in April. The by-products company has been a producer of insecticides since 1885 and is claimed to be the world's leading manufacturer of nicotine sulphate.

First Gas-to-Oil Plant

The Carthage Hydrocol Company has announced that it is about to put into operation the first plant for the manufacture of synthetic petroleum from natural gas. The $30 million plant, at Brownsville, Texas, will use the new hydrocol process to treat 75-85 million cu. ft. of natural gas daily. Output should reach 6000 barrels of high octane petrol, 900 barrels of gas oil, 200 barrels of fuel oil, and 300,000 lb. of chemical by-products daily.

Fuel Research Projects in Spain

New Laboratories' Large Programme for Fuels

MUCH attention has been given in Spain in recent years to fuel research and to co-ordination and concentration of the State and private bodies concerned. This culminated in the formation of the Instituto Nacional del Combustible under one of the principal patronatos of the country—Patronato Juan de la Cierva.

This is actually a co-ordinating body controlling several research stations and centres, among which are the laboratories recently opened at Zaragoza for the scientific study of fuels in connection with the Faculty of Science in that city.

This research will be of a basic character although applications are not likely to be disregarded. Prof. Dr. V. Gómez Aranda describes the new buildings and the scope of their work, with numerous illustrations (*ION*, Jan. 1950, pp. 29-34).

The two primary considerations underlying these developments were (a) the importance of fuel research in Spanish economy, including the use of coal both as fuel and as raw material for important branches of chemistry, analogous to those based on petroleum; and (b) the present state of Spanish industrial progress intimately affected by fuel research.

From these points of view, even poor grade Spanish coal, possibly of little value as fuel, and metallurgical coke may be valuable raw materials for chemical industry. The author believes that, save in extreme cases, it will always be possible to apply processes to this end. He appears to be referring specially to the Aragonesian coals. But each distinct type or grade of coal must be thoroughly studied. Among the laboratories' first tasks will be a categorical evaluation, primarily of the coals of Aragon, but later of others.

This evaluation will include all the chemical and physical properties and constitution, results of low temperature distillation, hydrogenation, etc. Such work as has already been done in this large and varied field has shown profound differences, often in coals from the same source, *e.g.*, from the Val de Arino, which include also lignites.

The various departments of this research are briefly discussed under the headings of hygroscopicity, distillation ABT (low temperature), gas purification, semi-coke tests, coal tar research, high pressure hydrogenation—using a Bergius bomb of five litres capacity; sulphur problems, fluid catalysis (Mertens system, Belgium) with plant and methods supplied by Professor Mertens (Louvain University); and hydrocarbon properties. A comprehensive library and information service will be maintained and will be co-ordinated with those of other research centres.

Purchase Tax Exemption

A NEW order, The Purchase Tax (No. 6) Order, 1950, which has been made by the Treasury, re-enacts, with additions, the list of essential drugs and medicines exempt from purchase tax under the Purchase Tax (No. 3) Order (S.I.1949, No. 1529). All drugs previously exempt remain so. Any entries in the old list which no longer appear in the schedule to the new order have been assimilated into more comprehensive entries or re-classified, using the shortened name approved by the British Pharmacopœia Nomenclature Committee. Changes in the order, which came into effect on Monday, have added the following exempted items:—

Organic compounds of copper; plasma substitutes; 1 - Benzyl - 3 - (dimethylcarbamyloxy) - pyridinium bromide; Bis - 3 : 3^1 - (4 - hydroxy - coumarinyl) - ethyl acetate; 2 : 5-dihydroxybenzoic acid, and salts thereof; 2 : 2^1dihydroxy-5 : 5^1-dichlorodiphenyl-

(*continued at foot of next column*)

methane; dimercaprol; hexachlorethane; hexazole; mephenesin; 3-(1-piperidyl)-1-phenyl-1-cyclohexyl-1-propanol, and salts thereof; 2-aminoheptane, and salts thereof; chlorcyclizine hydrochloride; ethers for general inhalation anaesthesia, and mixtures thereof; phenadoxone, and salts thereof; preparations of the substance known as streptokinase, which is produced from a suitable strain of haemolytic streptococcus; isoprenaline; mepyramine maleate.

Ultrasonic Testing of Welds

THE greater part of the experimental and routine work in this investigation sponsored by the Steel Company of Wales (THE CHEMICAL AGE, *62*, 335-7) was carried out by Mr. J. W. Fox, whose name was inadvertently omitted from the attributions. The "source of finite diameter" (of the generation of ultrasonic waves) referred to by Mr. E. M. Lewis, was to distinguish this from the point sources used in Mulhauser's method. To secure beaming, the diameter of the source must be at least a few wavelengths.

W. GERMAN PRODUCTION INCREASES

Growing Activity in Chemical Export Markets

DESPITE continuing high unemployment, a seasonal decline in the building and allied trades, an unexpected contraction in exports, and general uncertainty about the economic outlook, production in the West German chemical industry has continued to increase.

The latest statistics, for January, show a rise in the output of sulphuric acid to 87,400 tons (83,200 in December), of nitrogen fertilisers to 40,200 tons (N) (34,600 tons), of phosphate fertilisers to 27,400 tons (P_2O_5) (25,000 tons), of soap to 6140 tons (5112 tons), and of dyestuffs to 2006 tons (1970 tons).

The West German dyestuffs industry has now decisively overtaken France and Switzerland and is again leading in continental Europe.

Of the new trade agreements, that with France is by far the most important for German chemical manufacturers. German ammonia, hydrocarbons, anhydrous phosphorus compounds and sulphur compounds are among products which will be freely admitted into France. Import quotas have been fixed by the French authorities for German calcium carbide, chlorine compounds, urea ($1,500,000), electric fuses, polystyrol, pharmaceuticals ($250,000), and dyestuffs intermediates ($350,000). West German suppliers may also send, among other things, $550,000 worth of pharmaceutical preparations to French North Africa, excluding Algeria.

France will not import from Western Germany penicillin, superphosphates, lacquers, paints, soap, solvents, fatty acid derivatives, sulphuric acid, or synthetic rubber. Western Germany, on the other hand, will not admit French fertilisers, (apart from rock phosphates), tartaric acid or synthetic edible fats.

Only a Beginning

The French-German commercial treaty does not, of course, interfere with the lists of commodities to be admitted freely into France which were published before the end of 1949, and German manufacturers are confident that they will be able to expand their chemical sales to the French market.

Other recent trade agreements also permit of larger chemical exports from Western Germany. Paraguay is to receive chemical products, including photographic films worth $150,000, and $200,000 worth of pharmaceutical products this year. A substantial expansion in exports of dyestuffs and chemicals has been noted in trade with Mexico.

Potash exports from Lower Saxony, where most of the West German production originates, last year realised $7,040,000, almost equally divided between crude salts and processed material. Though export proceeds of the potash industry have been affected by the devaluation of sterling and other currencies, a continued high level of potash exports is anticipated.

Currency Shortages

Exports of rock salt from Lower Saxony, on the other hand, fell last year from 156,000 to 110,000 tons, which were shipped mostly under old contracts. Foreign buyers, it is reported, cannot obtain currency permits, payable in dollars, for West German salt, and devaluation and high transport costs also impair the competitive position of German producers.

The difficulties encountered by West German pharmaceutical manufacturers last year, owing to overstocking by retailers and overestimating of demand, have by now been overcome, but domestic sales are impaired by the economy drive in the sickness insurance organisation, which normally accounts for 70 per cent of the home business.

In the export market sales are affected chiefly by currency considerations on the part of importing countries and competition by foreign subsidiaries of German producers which are using the original trade brands. In some cases exclusive rights to these trade marks have been given to local firms which formerly distributed the German preparations but now sell their own under the branded name. Partly to meet this competition, Farbwerke Höchst have changed their name to " Farbwerke Höchst vormals Meister Lucius und Brüning " and intend to introduce the old " MLB " mark for use abroad.

Rheinische Zellwolle AG, Siegburg (Rhineland), has changed its name to Chemie-Faser AG. The firm states that the term " Zellwolle " (cell wool) has been brought into disrepute by wrongful use, but the change may also be intended to

(*continued at foot of next page*)

REVIVING GERMAN LACQUER INDUSTRY

Nearing the Pre-War Level of Output

THE output of lacquers in Western Germany in recent months has closely approached the pre-war level. This reverses the situation during and immediately after the war, when the paint and varnish industries were greatly limited by the effects of war damage and lack of raw materials, fuel and power. The effects of war damage were slightly mitigated by the circumstance that the lacquer manufacturers in Germany are, for the most part, small or medium size concerns.

Continuous Growth

The Allied control has, to a certain extent, encouraged production of paint and varnish in order to minimise the ravages of corrosion and other deterioration of buildings and equipment.

Short supplies of raw material, however, continued to be a most serious obstacle, especially of linseed oil. But imports gradually increased, and by the first half of 1948 output of varnishes, etc., were 50 per cent of pre-war; the continuation of that improvement is shown in the table below.

The home market for lacquers is now much smaller, due to the loss of the eastern territory. Most of the production was centred in West Germany, and the east, with little productive capacity, naturally constituted a very important part of the home market. Quality appears to have been maintained, and although costs of production are such that competition in foreign markets is not easily met, there is strong hope that much of the former export trade will be eventually recovered.

Lacquers and varnishes are being made in West Germany by about 500 undertakings, the majority of which are small. Trading conditions are not easy for the smaller men: they often have to grant long credits to their customers, but in return have to pay on or before delivery for their raw materials or equipment.

The main difficulty with which the industry is at grips is its fairly intimate dependence on imported raw materials, largely from hard currency countries. Present estimates suggest this dependence requires the expenditure of some $20 million a year. By developing new methods and formulations it is hoped to dispense with a considerable part of this expenditure.

	Clear Lacquers (Oil)	Synthetic Resin Lacquers	Nitro-Lacquers (Tons)	Oil-free Synthetic Resin	Emulsions etc.	Total
1948	4,003	26,834	17,660	24,403	12,150	97,670
1949 (1st Quarter	1,517	9,742	5,863	6,025	1,643	32,754
1949 (2nd Quarter)	2,532	14,405	5,080	4,612	1,690	35,808
1949 (3rd Quarter)	—	—	—	—	—	41,647

W. GERMAN PRODUCTION INCREASES

(continued from previous page)

pave the way for an enlargement of the production programme, possibly by manufacture of a fully synthetic fibre based on the Furon fibre, on which the Phrix interests have been working. The plant at Siegburg is to be modernised. Its whole output of staple fibre has been sold ahead for a substantial part of the current year.

Petroleum refining operations are being resumed at the Gelsenberg-Benzin AG hydrogenation plant at Gelsenkirchen, in accordance with the Allied permit issued in February. Crude oil will be obtained from the Emsland fields near the Dutch frontier, and an output of 15,000-20,000 tons of petrol, 5000-10,000 tons of diesel oil and 1000 tons of motor fuel per month is expected.

The two hydrogenation plants at Wesseling and Gelsenkirchen should be able to deal with 42,000 tons of crude oil a month, or about half the German production, but in the absence of subsidies, which have not been received for some months, German oil production cannot compete with imported petroleum derivatives.

In Eastern Germany it is reported that the works at Böhlen, Zeitz and Leuna are together producing from lignite 50,000-60,000 tons of motor spirit and diesel oil a month.

The Stock and Chemical Markets

POLITICAL uncertainties and a general tendency in the City to defer action until the Budget is presented (probably on April 18) have diminished interest in the stock markets. British Funds have regained part of earlier declines, but there have been only small movements in industrial shares, despite the announcement of a number of increased dividends.

The view prevails that the Budget cannot be expected to bring any material reduction in the burden of taxation while Government expenditure remains at its present level.

Imperial Chemical were at 41s. 10½d. and the market expects that the company will maintain its dividend at 10 per cent for the past year. Profits may record a good advance. It is also assumed in the City that expansion and development plans may require further capital in due course.

Many leading industrial companies are believed to be in need of more capital, but market conditions, dividend limitation and other factors make for difficulty in raising it on terms attractive to shareholders. Consequently, it is reported, some companies have to augment their cash resources by selling part of their investments in British Funds. This partly accounts for the uncertainty which has ruled recently in the gilt-edged market.

Monsanto Chemicals have remained 51s. 3d., the shares being held firmly because of the good prospects of shareholders receiving more, should the dividend limitation request be removed. Fisons have been steady at 22s. 9d., awaiting the new issue terms. Turner & Newall eased to 76s. 6d. and Lever N.V. were weak at 41s. 6d., owing to selling in Amsterdam. Borax Consolidated (53s.) have been firm; British Glues & Chemicals 4s. shares held at 20s. 3d.; and Glaxo Laboratories 10s. units have been active at 45s. Firmness at 94s. 6d. was shown by British Oxygen, awaiting the financial results.

Triplex Glass 10s. units have been steady at 18s. 6d., but United Molasses (37s. 3d.) failed to recover from their recent reaction. British Xylonite, at 58s. 9d., were inclined to improve and other shares of plastics companies were rather more active, including British Industrial Plastics 2s. shares at 5s. 7½d., Kleemann at 8s. 1½d. and De La Rue 23s. Iron and steels became steadier, but failed to recover from their recent reaction, investors holding off despite the good yields.

Oil shares were undecided, although Anglo-Iranian moved slightly higher on balance.

Market Reports

REPORTS from the industrial chemicals market refer to steady trading conditions and indicate that buying interest for the home consuming industries has been sustained. Overseas inquiries received by merchants and shippers continue on a good scale and are well spread over most sections of the chemical market. The items which are in day to day demand are moving steadily against contracts. Prices generally are unchanged, although a reduction in the controlled price of pig lead has resulted in lower prices for dry white lead and red lead. The new basis prices are: dry white lead £116 5s. per ton; ground white lead £136 10s.; red lead £106 15s.; orange lead £118 15s.; red lead ground in oil £129 15s.; and orange lead ground in oil £141 15s. There have been no important changes in the coal tar products market, although some improvement in export business is reported for cresylic acid and pitch. Toluol, xylol and the naphthas are moving well on a slightly better home demand.

MANCHESTER.—Business on the Manchester chemical market during the past week has proceeded on reasonably steady lines and home-trade deliveries of the principal light and heavy products have in general been on a good scale. There has also been a continued satisfactory movement on export account. A fair amount of replacement buying has been reported by domestic consumers, while shippers' inquiries have also been on a fair scale. The general price position remains firm. Sulphate of ammonia and a number of other fertiliser materials are now attracting some attention, and a steady trade is being done in most sections of the tar products market.

GLASGOW.—The Scottish heavy chemical market has this week shown a definite falling off in orders, and most of the business being done is for immediate requirements; there is a tendency for general reduction of stock orders.

Law and Company News

Commercial Intelligence

The following are taken from the printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages or Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

A. & W. Chemical Co., Ltd., London, E.C. (M., 18/3/50.) February 16, £2100 mort. (sec. 97, 1948 Act), to P. K. Metcalfe, Hove, and others; charged on 1 and 2 Cricketers Court, Lower Kennington Lane, Lambeth.

Butacet, Ltd., London, W.C., manufacturers of fermentation products, etc. (M., 18/3/50.) February 13, by order on terms, £2750 mort., to Coalite & Chemical Products, Ltd.; charged on 25 Grosvenor Crescent Mews, S.W.1. *£2651. December 28, 1949.

Rentokil, Ltd., Fetcham, manufacturers of insecticides, etc. (M., 18/3/50.) February 14, further charge, to Peckham Mutual Building Society securing £400 and further advances not ex. therewith £1700; charged on Dormers Hall (formerly Dormers), School Lane, Fetcham. *£4955. December 20, 1949.

Servisol, Ltd., Liverpool, manufacturers of chemical preparations, etc. (M., 18/3/50.) February 7, mort. and charge, to National Provincial Bank, Ltd., securing all moneys due or to become due to the Bank; general charge. *— April 10, 1949.

New Registrations

Land Pyrometers, Ltd.

Private company. (479,247). Capital £10,000. Manufacturers of all kinds of instruments, materials or equipment used in connection with temperature measurement, in particular with pyrometry, etc. Directors: F. W. Land, "Prenton," Church Lane, Dore, Sheffield; T. Land; E. H. Land.

New Swiss Chemical Company

The A.G. für Commercielle Chemie, Zürich,, has recently been registered with the object of engaging in the wholesale and entrepôt trade in chemicals, dyes and allied products. The share capital is Fr. 1 million.

Increase of Capital

The following increase in registered capital has been announced:—Stafford Salt & Alkali Co., Ltd., from £35,000 to £50,000.

Company News

African Explosives and Chemical Industries

Plans to raise £7.5 million over the next two years were announced last week by African Explosives and Chemical Industries, the I.C.I., Ltd., associate. Ordinary shareholders will be offered 4 million additional ordinary shares at 25s. each in 1950 and a further 2 million shares on the same terms in 1951. Devaluation, it was stated, had affected the whole of the mining outlook. Immediate extensions were necessary at the explosives factories, including the new ammonia plant under construction at Modderfontein.

Paper Sacks for Chemicals

A NEW factory for the production of Multiwall sacks is claimed by Bowaters Paper Mills, Ltd., to be only a part of that company's development plans at Ellesmere Port. Multiwall sacks are made from specially prepared paper and are a modern and hygienic form of packaging for bulk commodities; food, fertilisers and a variety of chemicals and other products intended for export.

The new factory is expected to alleviate the effects of the present shortage of hessian sacks. The announcement by the President of the Board of Trade, concerning extension of Bowaters' activities in the Wirral, is taken as foreshadowing an early start of construction of the factory.

New Public Hall

Scottish Oils, Ltd., is co-operating in arrangements for the provision of new public hall facilities at Polbeth, West Calder, in the shale mining area in Scotland.

Patent Processes in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of specifications accepted will be obtainable, as soon as printing arrangements permit, from the Patents Office, Southampton Buildings, London, W.C.2, at 2s. each. Higher priced photostat copies are generally available.

Complete Specifications Accepted

Polymerisation of esters and methacrylic acid.—E. I. Du Pont de Nemours & Co. May 29 1947. 635,581.

Methods of preparing a monoethyldibenzofuran.—British Thomson-Houston Co., Ltd. June 11 1947. 635,631.

Methods of preparing vinyldibenzofuran.—British Thomson-Houston Co., Ltd. June 11 1947. 635,632.

Manufacture of pyrimidine derivatives.—I.C.I., Ltd., W. R. Boon, and W. G. M. Jones. June 11 1948. 635,582.

Manufacture of substituted mononitronaphthalenes and substituted monoaminonaphthalenes.—Ciba, Ltd. July 17 1947. 635,635.

Manufacture of alkoxy silanes.—Metropolitan-Vickers Electrical Co., Ltd., and W. Simpson. March 2 1948. 635,726.

Separation of components of an azeotropic mixture.—Koppers Co., Inc. July 29 1947. 635,729.

Process and apparatus for the clarification of liquids.—Mirrlees Watson Co., Ltd. Aug. 7 1947. 635,591.

Manufacture of organo silicon esters.—J. G. Dow. (Dow Corning Corporation). Aug. 9 1948. 635,733.

Solid compositions containing diazotisable amines.—I.C.I., Ltd., F. Dawson, J. Swaine, W. Todd, H. Wakefield, and E. R. Wiltshire. Sept. 3 1948. 635,600.

Isomerisation of hydrocarbons.—I.C.I., Ltd., D. McNeil, and P. W. Reynolds. Oct. 20 1948. 635,508.

Apparatus for the production of artificial pneumothorax.—T. K. Evangelides. Nov. 26, 1947. 635,749.

Production of organohalosilanes.—Dow Corning Corporation, A. J. Barry, L. De Pree, and D. E. Hook. Dec. 4 1947. 635,645.

Esters of 3, 5, 5-trimethyl-1-hexanol and lubricating compositions.—E. I. Du Pont de Nemours & Co. Jan. 13 1948. 635,656.

Manufacture of water gas.—Humphreys & Glasgow, Ltd., and H. T. Cohen. March 25 1949. 635,414.

Apparatus for cleaning gas.—Humphreys & Glasgow, Ltd., N. H. Williams, and W. Hartley. April 5 1949. 635,539.

Catalytic conversion of hydrocarbons.—M. W. Kellogg. Oct. 6 1942. 636,524.

Pesticidal compositions.—B. F. Goodrich Co. July 18 1946. 636,459.

Wetting and detergent compositions.—American Cyanamid Co. Sept. 26 1946. 636,462.

Synthetic resin latices and method of making same.—B. F. Goodrich Co. Oct. 11 1946. 636,535.

Recovery of chlorohydrins.—Petrocarbon, Ltd., E. F. Chandley, H. M. E. Steiner, and E. Zimkin. Sept. 22 1947. 636,466.

Tolvenesulphonates and their method of preparation.—General Aniline & Film Corporation. Dec. 23 1946. 636,737.

Polymethine dyes.—General Aniline & Film Corporation. Dec. 23 1946. 636,738.

Method of preparing cyanamide and polymers thereof.—Soc. Anon. Des Manufactures Des Glaces et Produits Chimiques De St.-Gobain, Chauny & Cirey. Feb. 11 1947. 636,600.

Production of pitch mastic.—Low Temperature Carbonisation, Ltd., and C. Buist. March 19 1948. 636,602.

Production of double salts and hydrocarbon compositions containing them.—J. C. Arnold. (Standard Oil Development Co.). April 3 1947. 636,552.

Preparation of acylated amines.—Merck & Co., Inc. April 5 1947. 636,603.

Dehydrogenation of secondary alcohols to ketones.—I.C.I., Ltd., D. McNeil, and F. R. Charlton. April 7 1948. 636,743.

Apparatus for separating and forming suspensions of solids in liquids.—Compagnie De Produits Chimiques et Electrometallurgiques Alais, Froges & Camargue. April 21 1947. 636,744.

Production of alkylhalosilanes.—Dow Corning Corporation. June 3 1947. 636,559.

Process for reactivating a spent refining adsorbent.—N.V. De Bataafsche Petroleum Maatschappij. June 16 1947. 636,752.

Preparation of iron oxide reagent.—Gas Light & Coke Co., and R. H. Griffith. June 1 1948. 636,560.

Process for the manufacture of oxygenated compounds by controlled oxidation.—N.V. De Bataafsche Petroleum Maatschappij. June 30 1947. 636,754.

Vapourising and disseminating pest combating compounds.—I.C.I., Ltd., J. Gillies, and W. T. Cunningham. July 18 1947. 636,692.

Method of producing a composite synthetic resin and product thereof.—Koppers Co., Inc. Aug. 6 1947. 636,496.

Reaction products of styrene and anacardic materials.—Harvel Corporation. Aug. 7 1947. 636,694.

Reaction products of styrene aldehydes and polymeric anacardic materials. —Harvel Corporation. Aug. 7 1947. 636,695.

Manufacture of raw material for lacquers from resinous ethylene oxide derivatives of phenols and lacquers made therewith.—Ciba, Ltd. Aug. 7 1947. 636,696.

Manufacture of cyanamide and its derivatives.—Soc. Anon. Des Manufactures Des Glaces Et Produits Chimiques De St.-Gobain, Chauny & Cirey. Aug. 7, 1947. 636,697.

Process for obtaining pure orthotoluene sulphonamide.—Union Chimique Belge Soc. Anon. Oct. 27 1947. 636,504.

Process for the manufacture of an aldehyde from β-ionone.—Roche Products, Ltd. Nov. 13 1947. 636,642.

Production of amidines.—May & Baker, Ltd., and A. P. T. Easson. Nov. 18 1948. 636,777.

Process for the saponification of organic sulphochlorides and purification of the saponification products.—Severoceske Tukove Zavody (Drive Jiri Schicht), Narodni Podnik. Nov. 20 1946. 636,650.

Production of o-alkoxyphenyl glycerol ethers.—British Drug Houses, Ltd., W. Bradley, B. N. Feitelson, and R. M. Lodge. Jan. 6 1949. 636,569.

Reaction products of styrene drying oils and anacardic materials.—Harvel Corporation. Feb. 20 1948. 636,710.

Insecticides.—United States Rubber Co. Feb. 27 1948. 636,582.

Dehydrogenation of secondary alcohols to ketones.—I.C.I., Ltd., D. McNeil, and F. R. Charlton. April 7 1948. 636,800.

Adhesive dispersions of the oil-in-water type, and processes of preparing the same. —Minnesota Mining & Manufacturing Co. Jan. 29 1945. 636,102.

Art of polymerisation and method of polymerising vinylidene-group-containing liquid monomeric compounds.—G. L. Martin Co. March 27 1946. 636,385.

Injection moulding thermoplastic synthetic resins.—Soc. Per Azioni Lavorazione Materie Plastiche. May 2 1946. 636,110.

Colourless polymers of α-haloacrylic acid derivatives.—General Aniline & Film Corporation. May 23 1946. 636,318.

Polymerisation of alpha-halogen substituted acrylic compounds.—General Aniline & Film Corporation. May 23 1946. 636,319.

Method of forming resinous products derived from haloacrylic acid compounds.—General Aniline & Film Corporation. June 23 1945. 636,320.

Polymerisation of haloacrylic acid compounds.—General Aniline & Film Corporation. May 23 1946. 636,321.

Polymerisation of alpha-substituted haloacrylic compounds.—General Aniline & Film Corporation. May 23 1946. 636,322.

Polymerisation of alpha-haloacrylic compounds.—General Aniline & Film Corporation. July 1, 1946. 636,323.

Manufacture of catalysts from clay.—Houdry Process Corporation. Jan. 13 1947. 636,194.

Hydrocarbon conversion processes employing modified clay catalysts.—Houdry Process Corporation. Jan. 14 1947. 636,195.

Method of producing polyamides.—Bata Narodni Podnik. Jan. 17 1947. 636,198.

Method of preparing methyl para-vinylbenzoate and para-vinylbenzoate acid.—Monsanto Chemical Co. Jan. 23 1947. 636,196.

Manufacture of reducing agents derived from alkali sulphides and dyestuff preparations containing them.—Ciba, Ltd. Jan. 31 1947. 636,399.

Method of producing 4-amino-salicyclic acid.—A/B Ferrosan. Feb. 17 1947. 636,331.

Plasticisers for polyvinyl chloride.—Compagnie Française de Raffinage. Feb. 18 1947. 636,400.

Distillation processes and apparatus.—D. G. Randall. Feb. 18 1948. 636,332.

Manufacture of aromatic amino carboxylic acids.—Herts Pharmaceuticals, Ltd., D. D. Martin, D. E. Seymour, and F. S. Spring. Feb. 13 1948. 636,333.

Process for contacting finely divided solids with gases.—J. C. Arnold. (Standard Oil Development Co.). Feb. 28 1947. 636,401.

Process for the production of carbon monoxide and hydrogen.—C. Arnold. (Standard Oil Development Co.). March 31 1947. 636,206.

Production of interpolymers.—B. F. Goodrich Co. April 1 1947. 636,207.

Processes of making agglomerated sodium acid pyrophosphate and the product resulting therefrom.—Monsanto Chemical Co. April 2 1947. 636,209.

Manufacture of aromatic amino carboxylic acids.—Herts Pharmaceuticals, Ltd., D. D. Martin, D. E. Seymour, and F. S. Spring. Feb. 13 1948. 636,347.

Production of synthetic polymers.—S. J. Allen, and J. G. N. Drewitt. Aug. 25 1947. 636,348.

Process for the conversion of solid carbonaceous materials into gaseous fuels.—Standard Oil Development Co., and C. Arnold. June 20 1947. 636,225.

Polymerisation of vinyl halides.—B. F. Goodrich Co. Aug. 7 1947. 636,232.

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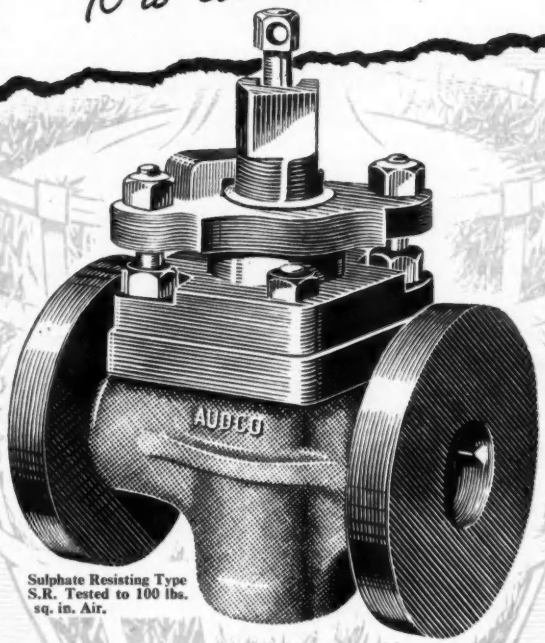

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Hydrocarbon Studies: The Vapour Phase

A NEW correlation in representing vapour-liquid equilibrium data of petroleum type hydrocarbons has been presented by Elliot I. Organick, of the University of Michigan, at a Houston, Texas, regional meeting of the American Institute of Chemical Engineers. The work was performed under the guidance of Dr. George Granger Brown, co-author of the paper and chairman of the department of chemical and metallurgical engineering at the University of Michigan.

Vapour-liquid equilibrium data are used in determining how much vapour will form when hydrocarbon mixtures are subjected to a specified temperature and pressure. This information is important in designing industrial plant equipment, such as heaters, coolers, condensers, compressors, and distillation columns.

Brown and Organick have revised the calculation methods used to predict hydrocarbon vapourisation properties, so that the laws now apply to systems containing methane, the prime constituent of natural gas. It was previously hard to evaluate such mixtures because of the erratic behaviour of methane when mixed with other hydrocarbons.

Another course of study in an associated field, the improvement of extractive distillation, was also recently described to the AICE in New York. It related to a new simplified method of separation of hydrocarbons of very close boiling points elaborated by H. V. Hess, E. P. Naragon, and C. A. Coghlan, of the Texas Company's laboratories at Beacon, New York.

Extractive distillation, which requires the addition of a third substance to facilitate the separation of two materials which boil at the same temperature, has been used to prepare raw materials for synthetic rubber. In the latest study, various additives to promote the separation of butane and butene-2 which might prove superior to those now in actual commercial use were investigated.

The latter substance is a principal starting material for butadiene, which in turn is the main constituent of GRS type synthetic rubber.

Hess reported on the effectiveness of aniline, from coal tar, and the cereal by-product furfural, as additives or solvents in extractive distillation. Results predicted from laboratory investigations will be used in large-scale pilot plant tests.

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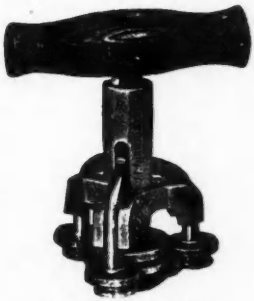

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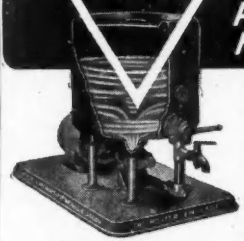

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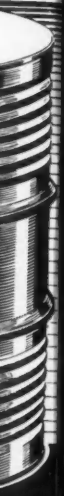

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